Vol. 8, No. 5 MAY, 1953

AGRICULTURAL CHEMICALS

In This Issue:

Now Even Better!

Through never-ending laboratory research confirmed by continuous tests in the field, Powell has achieved a new high in the emulsification qualities of its concentrates.

This season we are again able to announce new and better Powco Brand emulsifiable concentrates of DDT, Chlordane, BHC, Toxaphene, Dieldrin, Heptachlor and any other insecticide needs. They can save you both time and money—provide more effective results than ever before through:

Compatability with Fungicides!

Rapid Emulsification!

Improved Stability!

John Powell & Co., Inc.

ONE PARK AVENUE, NEW YORK 16, N. Y.

Sales Offices: Philadelphia · Pittsburgh · Chicago · Huntsville · Fort Worth · Omaha · San Francisco · Atlanta

Representatives in Principal Cities of the World

DDT · TOXAPHENE · BHC · CHLORDANE · LINDANE · ROTENONE · SABADILLA · PYRETHRUM & PYRIN · ANTU
PIPERONYL BUTOXIDE · ALLETHRIN · TEPP · PARATHION · ALDRIN · DILAN · HEPTACHLOR · 2, 4 D & 2, 4, 5-T.

LOOK TO POWELL...FOR CONSISTENT, TROUBLE-FREE QUALITY

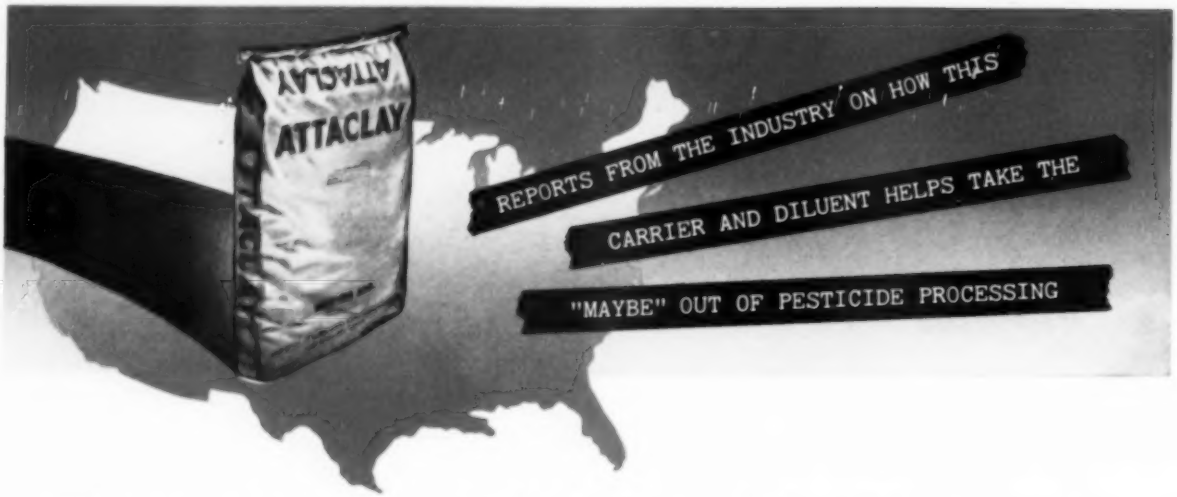
NEW FRONTIER

Years ago when Horace Greeley was counselling young men to "go west", there were millions of rich acres to be claimed and farmed. Today, the new challenge to man's ambition is in the build-up of impoverished lands.

Potash Company of America, a prime producer of unexcelled red muriate potash, is proud of its position as a major contributor to the reclamation of these lands.

POTASH COMPANY of AMERICA
Carlsbad, New Mexico

General Sales Office . . . 1625 Eye Street, N. W., Washington, D. C.
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.
Southern Sales Office . . . Candler Building, Atlanta, Ga.



These plants and Attaclay® joined forces to make dry dusts from sticky, solid chemicals

LOCATION: Gulf Coast
PRODUCT: 50% DDT dust base
EQUIPMENT: roller mill
PRODUCTION MANAGER: *Our roller mill "told" us Attaclay was the least costly material to use. With Attaclay we make 40% more of a top-grade concentrate.*

LOCATION: Pacific Northwest
PRODUCT: 50% DDT dust base
EQUIPMENT: air mill
OWNER: *We've learned through experience that Attaclay gives us a superior product with excellent uniformity.*

LOCATION: West Coast
PRODUCT: BHC dust base and wettable powder
EQUIPMENT: fluid energy mill
PLANT MANAGER: *Our previous experience with other carriers was not good. Mills "gummed up" quickly . . . too many shut-downs. Attaclay lengthened our grinding cycle time to a point where production was upped 50%.*

LOCATION: Mississippi
PRODUCT: 9-15 BHC-DDT cotton dust base
EQUIPMENT: steam-jacketed ribbon mixer
PLANT SUPERINTENDENT: *Our 9-15 bases made with Attaclay didn't "set up" on standing. I can't say the same for any other carrier we tried.*

The season-after-season vote of confidence on the part of Attaclay users all over the world tells its own forceful, conclusive story. Write us for a generous sample and detailed data . . . count on us for any help you need.

ATTAPULGUS Minerals & Chemicals Corporation

Dept. P, 210 West Washington Square, Phila. 5, Pa.

HERE'S HELP FOR YOU—a new 12-page booklet entitled "Road Map To Quicker, Easier and Better Pesticide Formulations Through Attaclay." Your free copy for the writing.

AGRICULTURAL CHEMICALS

THIS MONTH'S COVER

Protection of stored grain from insect damage is one of the major problems of agriculture. Here "Pyrenone" is dusted into corn as the grain is loaded into bin. This method does not penetrate shuck of snapped corn, but does prevent migration of insects into sound ears. Watch for full story of grain protection in June issue. (Photo by U. S. Industrial Chemicals, Inc.)

VOL. 8 No. 5
MAY 1953

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AGRICULTURAL CHEMICALS

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Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

Cut fertilizer curing time up to 90%

Fertilizer bag on right uses Santomerse No. 1. Bag on left does not.

Reduce hardening in bin and bag with SANTOMERSE No. 1

The proved wetting agent for use in fertilizer manufacture.

Minute amounts of Santomerse No. 1 can make remarkable improvements in your mixed goods:

Cuts curing time 27 days . . . records show numerous instances where curing time has been reduced from 30 to 3 days, thanks to a quicker, more *thorough* reaction with Santomerse No. 1.

Reduces hardening in bin and bag . . . many times you no longer have to use dynamite in bin. Light in density, Santomerse No. 1 readily disperses through product and decreases caking.

Stops "salting-out" . . . wetting action of Santomerse No. 1 prevents formation of large needle-like crystals on surface of mix.

FOR COMPLETE INFORMATION on this application contact your nearest Monsanto Sales Office. Monsanto worked closely with the *original developers* of this technique. It has a fund of experience *unmatched* by any other producer on this subject. If more convenient write to MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle, Twin Cities. In Canada, Monsanto Canada Limited, Montreal.

Santomerse: Reg. U. S. Pat. Off.

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

The toughest three-letter word in business

"But . . ."

The word a man uses when he starts by nodding yes and ends by saying no.

"But . . ."

The word on a Multiwall buyer's tongue just after he's said, "Well, as long as we order by specification, I guess one brand's as good as another . . ."

Executives who purchase more than 85 per cent of all Multiwalls have a big BUT there.

They testify* that there are many other considerations. Among the most important, the reputation of the manufacturer. They judge him by his record of reliability, his effort to meet delivery dates, his willingness to give a full measure of service.

We welcome the challenge of the toughest three-letter word in business. We believe the attention big buyers of Multiwalls pay to the *extra* factors—dependability, for instance—has a lot to do with their giving Union a greater proportion of their Multiwall business.

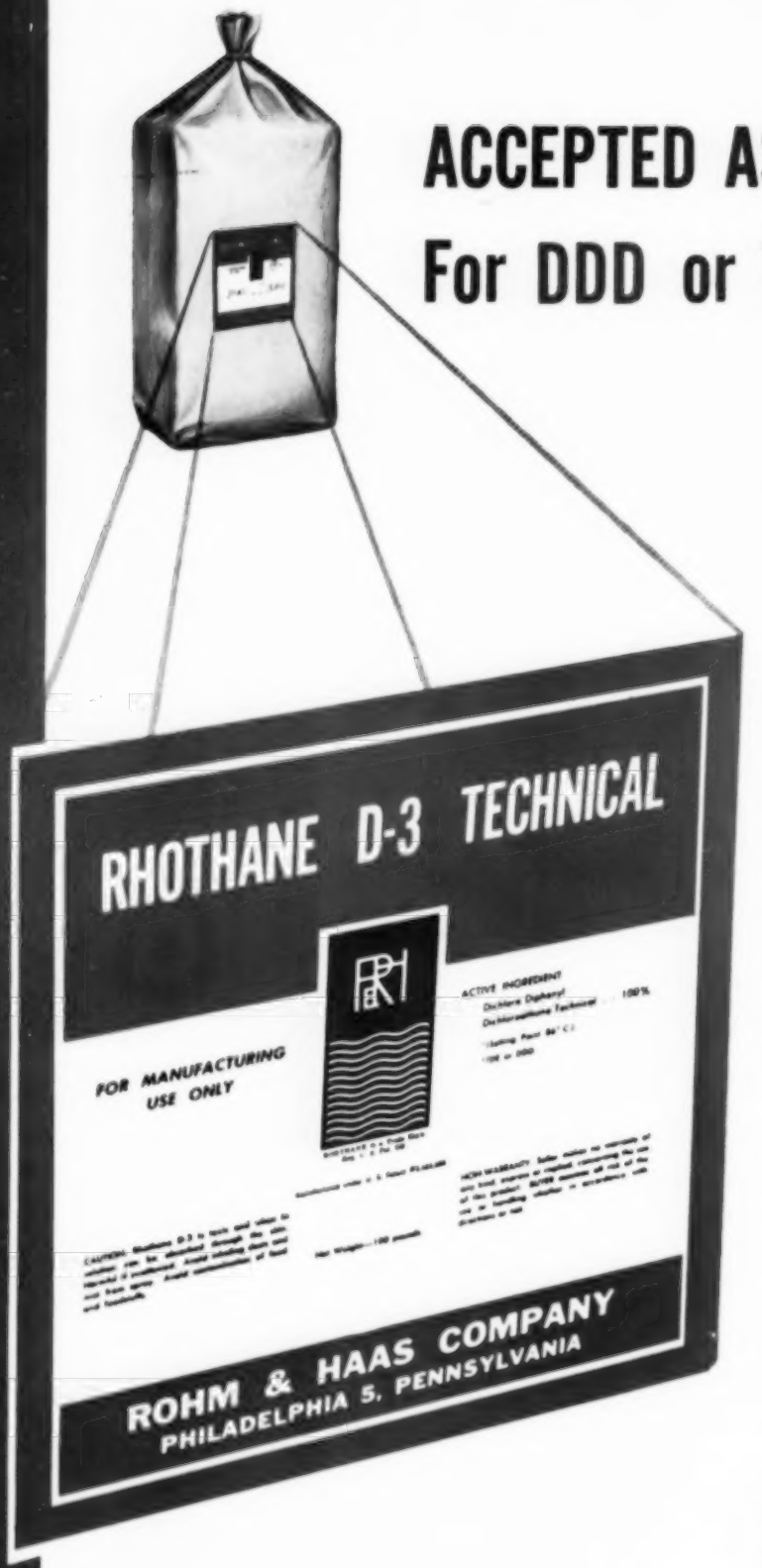
More so every day . . .

IT'S UNION FOR MULTIWALLS

TRADE MARK UNION

*August, 1951 research study.

UNION BAG & PAPER CORPORATION • NEW YORK: WOOLWORTH BUILDING • CHICAGO: DAILY NEWS BUILDING



ACCEPTED AS THE STANDARD For DDD or TDE Insecticides

Because RHOTHANE effectively controls such pests as red banded leaf roller, tobacco hornworm, tomato hornworm corn earworm, and a host of other pests, *without injury to plants*, this Rohm & Haas insecticide is accepted as the standard for DDD or TDE formulations.

Rohm & Haas pioneered in the development, manufacture and application of this type of insecticide. And for five years Rohm & Haas has maintained its leading position in the DDD field.

RHOTHANE is available to formulators as RHOTHANE D-3 technical flakes, as dust (AD-50), wettable powder (WP-50), and emulsifiable concentrate. For complete technical data and suggested formulations, write our Agricultural and Sanitary Chemicals Division.

CHEMICALS FOR AGRICULTURE

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

RHOTHANE *is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.*

. . . use CELITE

One way to be sure of producing a dry dust concentrate that will give top performance in the field is to use Celite in your primary grinds.

The presence of only a small percentage of this diatomite powder—because of its great bulk per unit weight, and the irregular shape of the individual particles—fluffs up the final dust. This helps neutralize the effect of heavy extenders—insuring better dispersion of the poison.

Celite is also an excellent absorption medium for liquid poisons. Its exceptionally high absorption capacity permits a much higher percentage of liquid poison to be absorbed while still maintaining a dry dust concentrate. This results in a more potent effect in the final product . . . as well as in lower packaging and shipping costs.

Why not investigate the use of Celite as a means of improving your product and making your operation more profitable? For further details, write Johns-Manville, Box 60, N. Y. 16, N. Y.

Properties of CELITE

FINENESS: Approximately 100% through 325 mesh
DENSITY (Vibrated): 11 pounds per cubic foot
BULK: Celite bulks much higher than most diluents
ABSORPTION: 200% of its weight of water
300% of its weight of kerosene
pH VALUE: Below 7.0
INERTNESS: Compatible with insecticide and fungicide poisons
SUSPENSION: Excellent in both air and water
COMPOSITION: Celite is amorphous diatomaceous silica (SiO_2)

Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE

JOHNS-MANVILLE PRODUCTS

DILUENTS AND GRINDING AIDS

use TEPP* for low-cost effective control of

red spider mites
aphids
flea beetles
thrips
leafhopper nymphs
cabbage caterpillar
AND MANY OTHER PESTS

Some users are saving from ⅓ to ½ of the cost of insecticides and insecticide application by using TEPP exclusively. With efficient TEPP, fewer applications are needed and crop losses are reduced to a minimum.

Another big advantage of TEPP is that it kills pests but leaves no poisonous residue. Farmers spray one day and harvest poison-free crops 48 hours later! Swift-acting, powerful TEPP stops those last-minute infestations that can devastate a fine crop.

TEPP is available 1) as a liquid concentrate, 2) as a stabilized dust, and 3) combined with other active ingredients. For quick kills and cleaner crops, specify TEPP formulations from your supplier.

TEPP*

means pest-free crops

poison-free crops

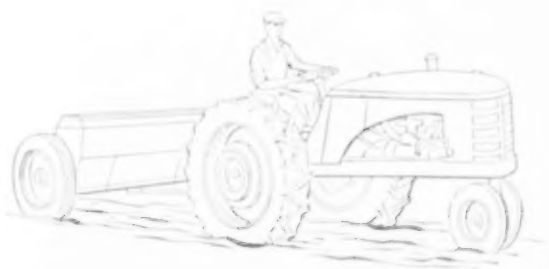
*Tetraethyl Pyrophosphate is made from triethyl Phosphate—an Eastman chemical. TEPP is not made by Eastman. For the names of manufacturers of TEPP, write to Eastman Chemical Products, Inc., Chemicals Division, Kingsport, Tennessee.

Eastman
CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE

Sales representative for **TENNESSEE EASTMAN COMPANY**, division of **EASTMAN KODAK COMPANY**

MATHIESON

AGRICULTURAL CHEMICALS



anhydrous ammonia
superphosphate
ammonium sulphate
nitrate of soda
base goods

9-gamma BHC dust base
9-15 BHC-DDT dust base
50% DDT dust base
12-14-gamma technical BHC
36-gamma technical BHC
ground and refined sulphur

high analysis pelletized fertilizers:
Ammo-Phos-16-20-0, 13-39-0
Ammo-Phos with potash such as 12-24-12, 13-13-13
regular grade mixed fertilizers

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for complete information write:

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Division of Mathieson Chemical Corporation
Little Rock, Arkansas

USE THIS 1 UNIT

FOR ALL GENERAL PURPOSE INSECTICIDE GRINDING

This versatile Roller Mill is widely used in modern plants for producing the many different types and grades of insecticide powders.

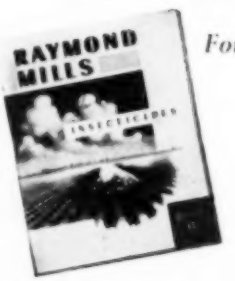
It does an efficient job in fine grinding and intimately blending various concentrates at finenesses as high as 99% or better passing 325 mesh . . . also in making field strength formulations at unusually high capacities directly from technical grade insecticides.

RAYMOND ROLLER MILL

with Whizzer Separator offers important advantages in maintaining product quality and lowering production costs:—

- **The unit delivers a thoroughly blended, homogeneous mixture.**
- **Whizzer separation provides wide range fineness control by one simple adjustment and insures uniformity of product.**
- **Clean, dust-free operation and practically continuous production without shutdowns for cleaning.**

Whatever your grinding problem, there is a Raymond Mill to efficiently handle the job.



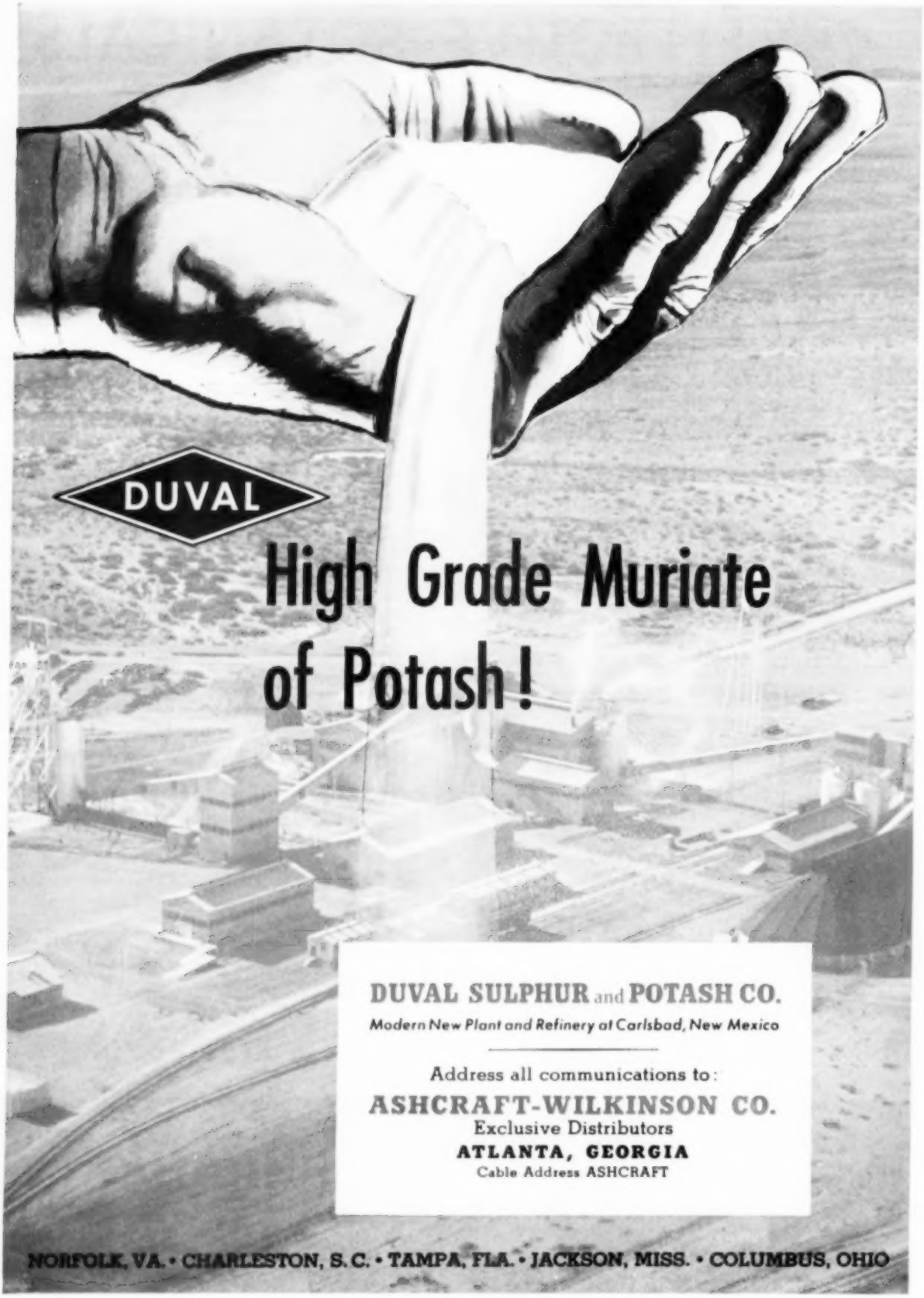
For Complete Details . . .
Write for No. 68
Raymond Bulletin

COMBUSTION ENGINEERING, INC.

1314 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

Raymond
PULVERIZER DIVISION

SALES OFFICES IN
PRINCIPAL CITIES


DUVAL
High Grade Muriate of Potash!
DUVAL SULPHUR and POTASH CO.
Modern New Plant and Refinery at Carlsbad, New Mexico
Address all communications to:
ASHCRAFT-WILKINSON CO.
Exclusive Distributors
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NORFOLK, VA. • CHARLESTON, S.C. • TAMPA, FLA. • JACKSON, MISS. • COLUMBUS, OHIO

FASTER FILLING IS AN EXTRA DIVIDEND WITH PYRAX ABB

The same superior qualities which make Pyrax ABB dusts more effective on the farm make Pyrax ABB a better diluent in the blending plant.

Pyrax ABB is non-hygroscopic . . . your blending and bagging goes faster even in damp air . . . your customers can dust in almost any weather.

Pyrax ABB is chemically inert . . . you can mix dusts when the demand is light . . . you can store surplus dusts from season to season without deterioration.

Pyrax ABB is free-flowing . . . you get faster filling and quicker, more homogeneous blending . . . no more costly and exasperating breakdowns when the rush is on at your bagging station.

Pyrax ABB is versatile . . . you need only this one carrier for all your dusts because Pyrax ABB is compatible with ALL the usual insecticides and fungicides.

Learn all the reasons why you should be using Pyrax ABB in all your dusts. Write today for new Bulletin No. D23, containing the latest technical data on the use of Pyrax ABB as a diluent.

R. T. VANDERBILT CO.
SPECIALTIES DEPARTMENT
230 PARK AVENUE **NEW YORK 17, N. Y.**

☐ Please send bulletin No. D23.
☐ Please send sample of Pyrax ABB.

NAME _____

POSITION _____

(Please attach to, or write on, your company letterhead)

THE GEIGY GALLERY

...of the world's mightiest insects

Called the most massive bug in the world, the African Goliath Beetle roars into flight like a giant bomber.

african goliath beetle VS. boll worm

The African Goliath Beetle is one tough hombre. If you should ever meet him in a dark alley, don't reach for your aerosol. Just get out in a hurry.

Not so with the Boll Worm. Wherever you find this versatile glutton you may be confident there is a Geigy chemical that will take away his appetite and, his life.

This pest assumes many roles and consumes many crops under such aliases as tomato fruitworm, tobacco budworm, corn earworm, cotton boll worm, etc., etc. But no matter what form he takes he cannot escape the fate that awaits him when Geigy products are specified.

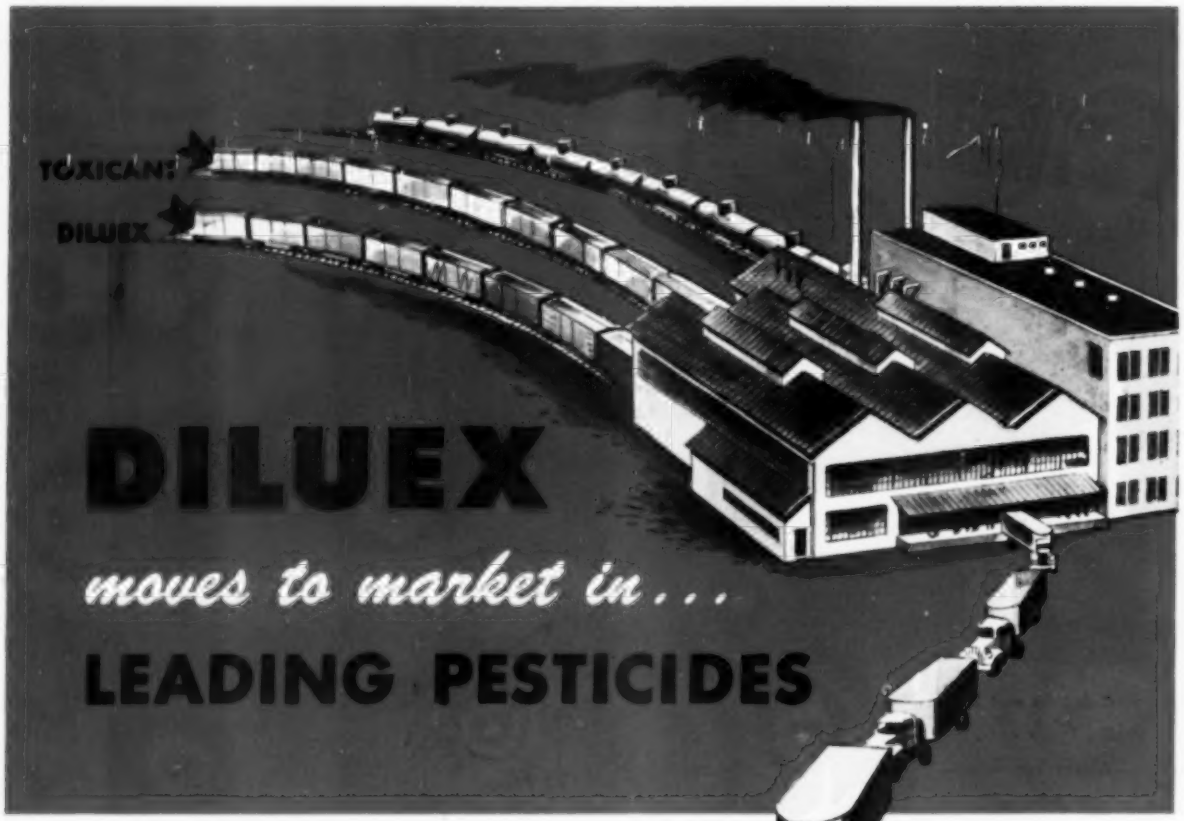
In fact, no matter what your pest problem, depend on Geigy's complete line of agricultural chemicals.

ALDRIN • ARAMITE* • ARSENICALS • BHC • CARBAMATES • CHLORDANE • COPPER • DDT
DIELDRIN • HERBICIDES • LINDANE • MALATHON • METHOXYCHLOR • PARATHION • PCP • SEED
DISINFECTANTS • TDE (DDD) • TEPP • TOXAPHENE

*Trademark U. S. Rubber Co.

ORIGINATORS OF Geigy DDT INSECTICIDES

GEIGY COMPANY, INC. 89 BARCLAY STREET, N. Y. 8, N. Y.



DILUEX

moves to market in . . .

LEADING PESTICIDES

On the basis of technical study and practical experience, Floridin products, extracted and specially processed at Quincy and Jamieson, Florida, are coming into more and more general use in the agricultural chemical industry.

Are you impregnating toxaphene—chlordane—aldrin—parathion—any liquid toxicant?

Are you milling DDT, BHC, or other organics?

Formulating blended dusts?

For any of these processes, it will be worth your while to learn about DILUEX and DILUEX-A.

As grinding aids, adsorbent concentrate bases, and dust conditioners for the most exacting uses of the industry, Floridin products have won a leading place. The demand for DILUEX and DILUEX-A, increasing steadily for many years, has recently grown to multiplied tonnage. Production facilities have been enlarged accordingly, and shipments are being made without delay, by train and truck from two Floridin plants at Quincy and Jamieson, Florida. Correspondence is invited.

FLORIDIN COMPANY

Adsorbents . . . . Desiccants . . . . Diluents

Dept. M, 120 Liberty St., Warren, Pa.

AVAILABLE NOW

Good news! Phillips *66* Ammonium Sulfate is available *now!* It is *dry-cured*. Dry-curing removes excess moisture—prevents caking. Uniform crystals flow freely—mix easily. Contains 21% nitrogen. Ideal for mixed goods manufacture and for direct application for all farm crops.

Contact us now for immediate shipment of bulk or bagged Phillips *66* Ammonium Sulfate.

Phillips also produces Nitrogen Solutions, Ammonium Nitrate, and Anhydrous Ammonia. Write our nearest district office for full information.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company

FERTILIZER SALES DIVISION · BARTLESVILLE, OKLAHOMA

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PASADENA, CALIF.—604 Citizens Bank Bldg. • NEW YORK, N. Y.—80 Broadway • BARTLESVILLE, OKLA.—Adams Bldg.

NITROX*

Promising New Cotton Insecticide

NITROX is Chemagro's trademark name for methyl parathion—O,0-dimethyl O-p-nitrophenyl thiophosphate. NITROX is a homologue of parathion and, like parathion, it was developed by Farbenfabriken Bayer. Chemagro is licensed by Bayer to manufacture NITROX in this country by the Bayer process.

NITROX made by the Bayer process has shown great promise against boll weevil, aphids, mites, leafworm, and thrips on cotton. In combination with DDT, protection against bollworm and pink bollworm is also indicated.

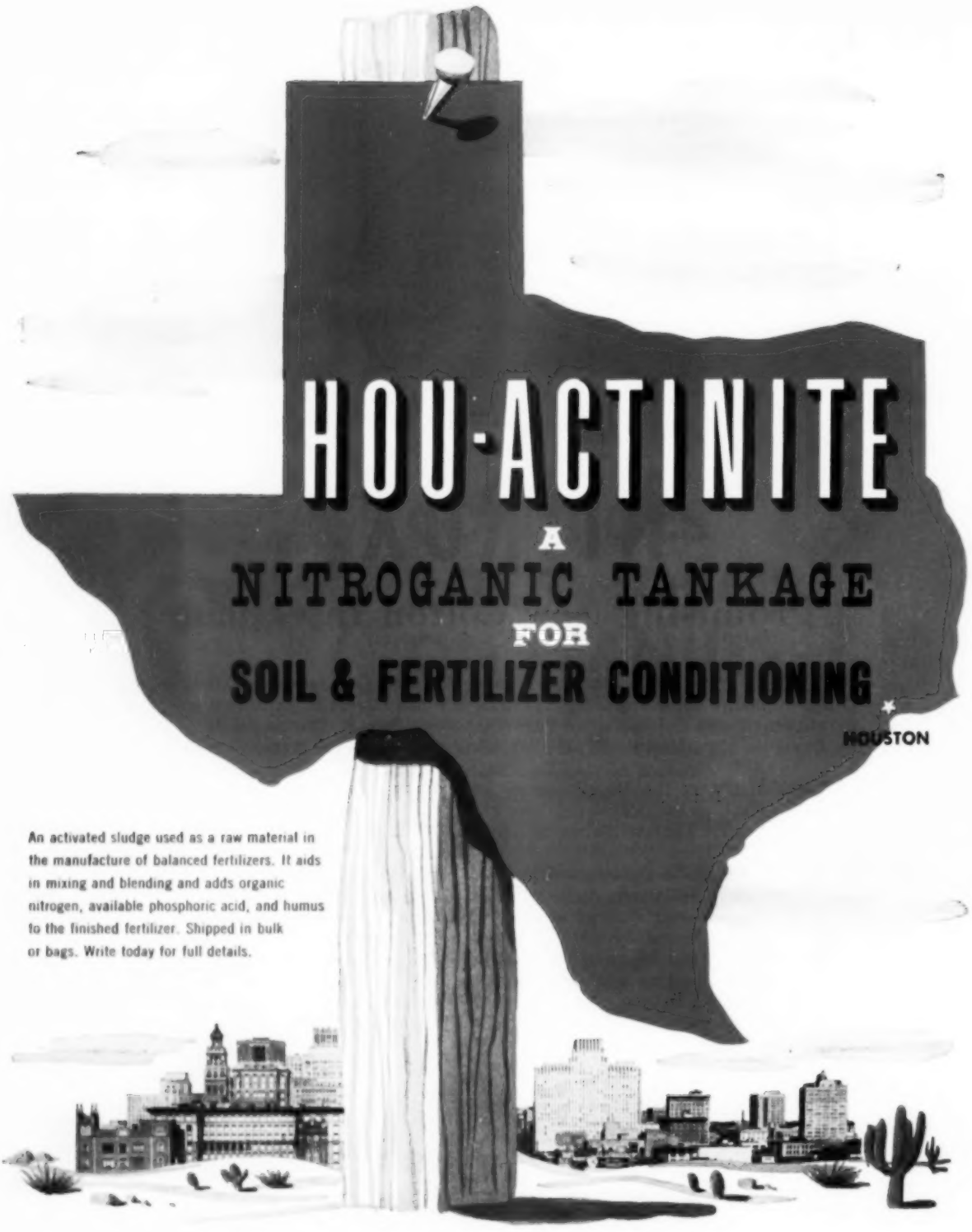
In one large scale test conducted in 1952 against a heavy infestation of boll weevil and pink bollworm, the use of NITROX spray resulted in a six fold increase in yield over that of untreated acreage in the same location.

NITROX is being sold commercially for use on cotton this year as a dust containing 2½% active and as a spray containing 2 pounds active per gallon. Because NITROX in combination with DDT seems effective against the entire range of cotton pests, it seems destined to become an important cotton insecticide.

* REGISTERED TRADEMARK OF CHEMAGRO CORPORATION

CHEMAGRO CORPORATION

350 FIFTH AVENUE, NEW YORK 1, N.Y.

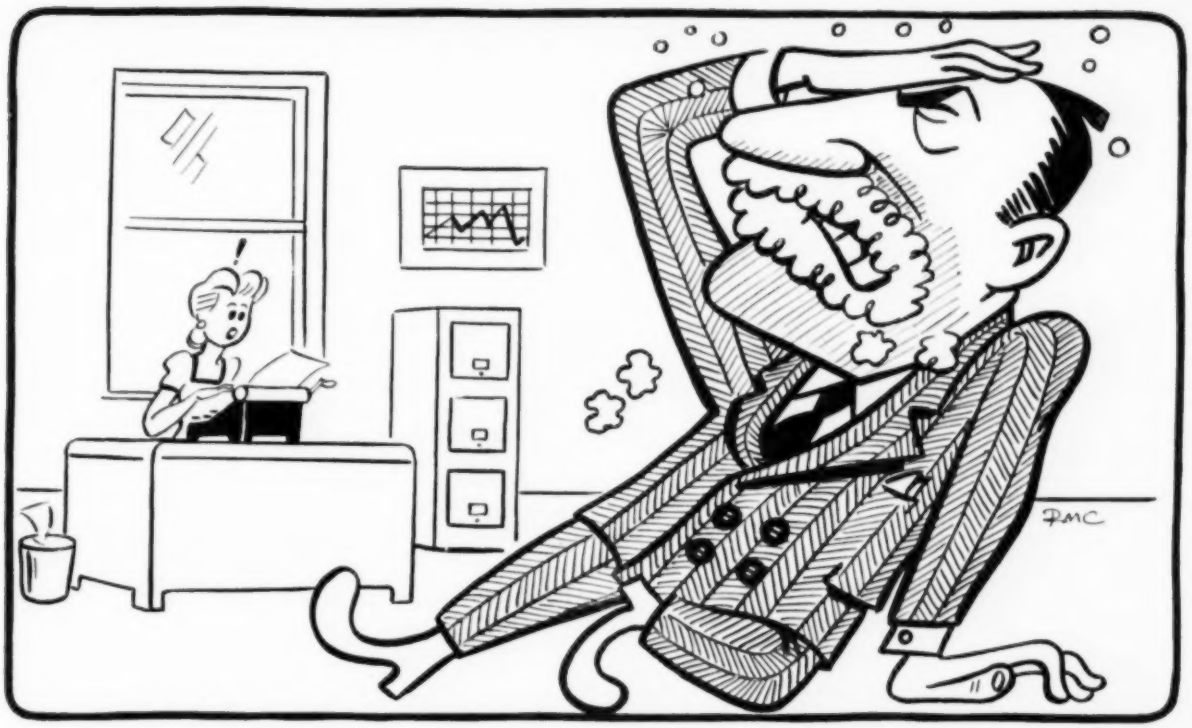


An activated sludge used as a raw material in the manufacture of balanced fertilizers. It aids in mixing and blending and adds organic nitrogen, available phosphoric acid, and humus to the finished fertilizer. Shipped in bulk or bags. Write today for full details.

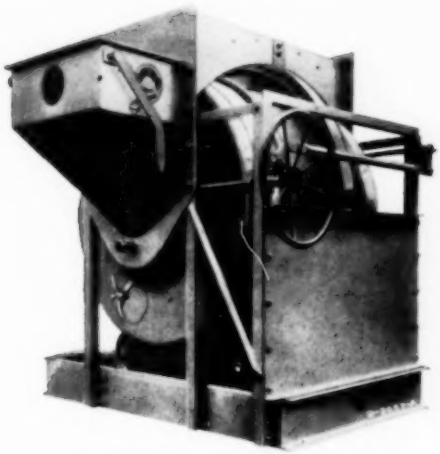
SOLE DISTRIBUTOR:

H. J. BAKER & BRO.

600 FIFTH AVENUE • NEW YORK 20, N. Y.



He can't stand that slow mixing cycle!



THE MODERN WORTHINGTON DRUM-TYPE FERTILIZER MIXERS are available in capacities of ½, 1, 2 and 3 tons.

But you don't have to go *that* far, chum. Give us a chance to help. We've got a mixer that can boost your daily output as much as 10%. It's the Worthington fertilizer mixer with an engineered blade design that gives the fastest mixing cycle we know of. You save time with every batch and can set up the mixer for continuous agitation. Mixing is thorough, too, and special mixer design eliminates these other big problems for you:

CORRODED DISCHARGE CHUTE—the Worthington discharge chute is out of the mixer during mixing time. Proper balance makes manual control of chute easy. Pneumatic controls are also available.

HARMFUL DUST SPREADING—the Worthington fertilizer mixer's charging and discharging chutes are designed for dustproof operation. A sealing disc attached to the discharge chute revolves with the drum to assure dustproof mixing.

HEAVY HORSEPOWER CONSUMPTION — Worthington's specially engineered anti-friction construction assures peak operating efficiency with lowest possible horsepower consumption.

YR.3.3

WORTHINGTON

Industrial Mixers

SEND THIS COUPON TODAY to learn more about how to reduce mixing time and cost with a Worthington fertilizer mixer. There's a skilled Worthington engineer near your plant. At your request, he'll be glad to call on you.

Worthington Corporation
Industrial Mixer Division
Plainfield, New Jersey

C

Name .....

Position .....

Address .....

City ..... Zone ..... State .....

☐ I'd like more information. ☐ I'd like to talk with an engineer.

ONE versatile product for all these uses:

Penite® 6*

Penite 6 is a highly concentrated sodium arsenite solution useful in many ways to both industry and agriculture.

For potato top killing: Penite 6 makes harvesting easier; lessens possibility of tuber late blight; allows earlier harvesting; toughens potato skins, thus reducing damage by mechanical harvesting.

For weed control: Penite 6 kills top growth of most plants, usually prevents regrowth for an entire season. Heavier applications control weeds and grass in soil for several years. When properly applied, can be used in controlling submerged vegetation in ponds and lakes, without injury to fish.

For termite control: Penite 6 is deadly to termites, prevents costly damage. Especially suitable because it is odorless.

For debarking: Simple painting of girdled area on tree trunk with Penite 6 causes bark to loosen, lessens tree's weight, lowers shipping costs.

For tree and stump killing: Penite 6 serves in thinning stands of timber, and preventing resprouting of newly cut stumps.

This heavy, viscous liquid contains not less than 54.5% arsenic trioxide equivalent to 71.5% sodium arsenite. These percentages are equivalent to approximately 9.5 pounds arsenic trioxide or 12.5 pounds of sodium arsenite per gallon of product. It mixes readily with water, does not require any special spraying equipment. It is non-flammable and non-explosive.

Although Penite 6 is extremely poisonous, and should therefore be handled with care, it is easy and safe to use when proper precautions are taken. Pennsalt supplies it in handy 5-gallon cans and in 30-gallon drums.

Write for Bulletin #208 which describes in detail the many uses of Penite 6. Address: Agricultural Chemicals Dept., Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.—Bryan, Texas—Berkeley and Los Angeles, Calif.—Portland, Oregon—Tacoma, Wash.

***KNOWN AS PENITE 6X IN THE WEST**

Pennsalt Chemicals

2,4,5-T ACIDS and ESTERS

CLEAR THAT TRACK!

Big market ahead for 2,4,5-T formulations! And demand will increase as agriculture, industry and government continue to find more uses for this potent herbicide.

2,4,5-T formulations eliminate mesquite, poison ivy and numerous other woody and unwanted plants. Railroads, utilities, airports and oil companies use it to clear their rights of way. Cattle and forestry men spray it to rid their ranges and woodlands of mesquite and other brush.

To meet that rising demand, Ethyl offers you a dependable, continuing supply of this increasingly popular chemical for brush killer formulations. And at a favorable price. The coupon below brings information of interest to every profit-minded formulator. Mail it today.

ETHYL CORPORATION

100 PARK AVENUE, NEW YORK 17, NEW YORK

ATLANTA, BATON ROUGE, CHICAGO, DALLAS, DAYTON, DENVER, DETROIT, HOUSTON, KANSAS CITY, LOS ANGELES, NEW ORLEANS, PHILADELPHIA, PITTSBURGH, SALT LAKE CITY, SAN FRANCISCO, SEATTLE, TULSA, MEXICO CITY AND (ETHYL ANTIKNOCK, LTD.) TORONTO.

ETHYL CHEMICALS — ETHYL CORPORATION

ETHYL CORPORATION
100 Park Avenue, New York 17, N.Y.

Please send more information on 2,4,5-T Acids and Esters.

NAME _____

FIRM _____

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DEPENDABLE QUALITY

THE dependable quality of papers and materials used in Hammond Multi-Walls . . . combined with the most modern and efficient production methods and equipment . . . assures you of the finest paper bags on the market.

Consult the Hammond man near you for Hammond Multi-Walls that meet all shipping requirements of your products. You can rely on him for accuracy and promptness in filling your needs.

Hammond Multi-Walls

For Multi-Wall bags, "make it a habit to depend on Hammond."

HAMMOND BAG & PAPER COMPANY

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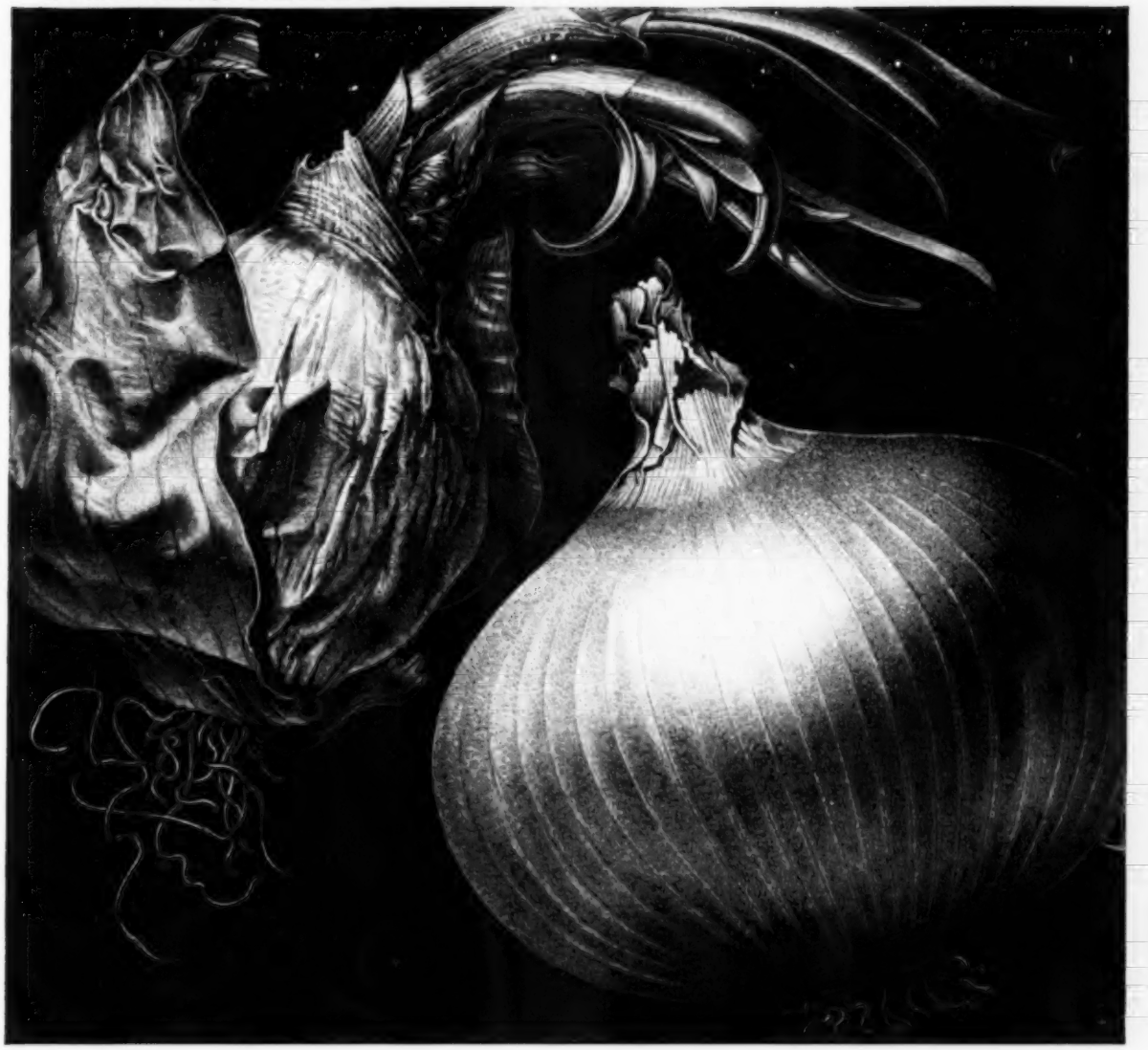
Plants in Wellsburg, W. Va. and Pine Bluff, Ark.

Representatives in the following cities: CHICAGO, ILL. • BLUEFIELD, VA. • CHARLOTTE, N.C. • KANSAS CITY, MO. • MINNEAPOLIS, MINN. • LIGONIER, PA. • WASH'NGTON, D.C. • NEW YORK, N.Y. • AKRON, OHIO • HOUSTON, TEXAS

Left – untreated onion; Right – treated with MH-40



Naugatuck nips storage growth in bud!

The United States Rubber Company's Naugatuck Chemical Division has good reason to believe it has dealt a death blow to destructive storage growth. The reason is a new Naugatuck chemical – a water soluble salt containing 40% maleic hydrazide and called MH-40.*

Every grower knows the advantage of storing away part of a crop like onions until the market is more favorable. And every grower also knows the risk involved – namely, the sprouting, shriveling and wrinkling which can make that crop unsalable.

As far back as 1947, Naugatuck's research scientists came up with the first version of MH-40. Since then, working in cooperation with more than 250 experiment stations and other agriculturists, they have discovered hundreds of potential uses for this unique new chemical. One of these uses was for the inhibition of storage growth.

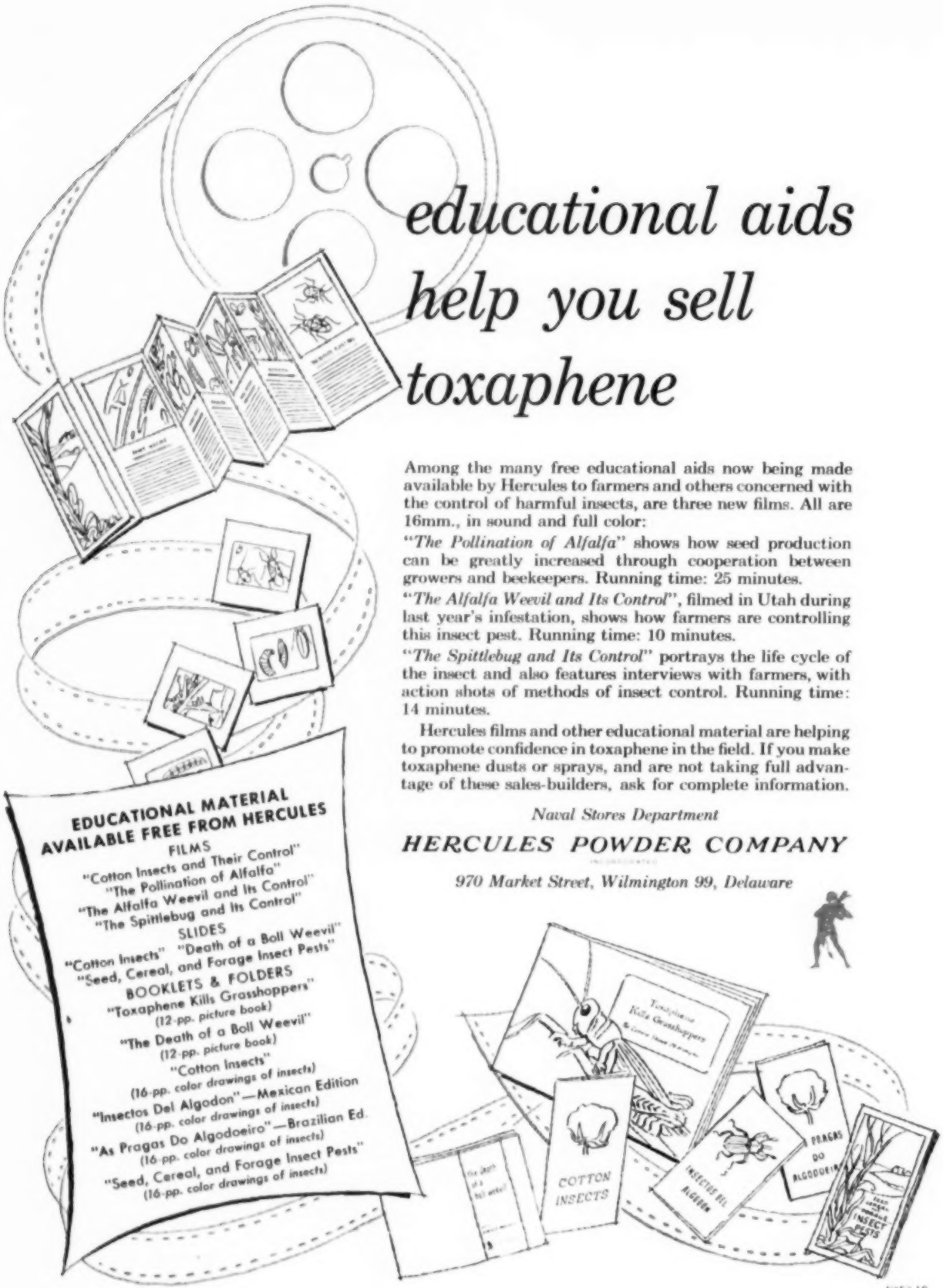
Today MH-40 is commercially available as a grass inhibitor and wild-onion killer. And it won't be long before it will be made available as a storage growth inhibitor, too! *U. S. Pat. No. 2,614,916

MH-40 is one more example of Naugatuck know-how at work, always striving to introduce new and better products to the agricultural field.

UNITED STATES RUBBER COMPANY Naugatuck Chemical Division, Naugatuck, Conn.

manufacturers of seed protectants – Spergon, Spergon-DDT, Spergon-SL, Spergon-DDT-SL, Phygon Seed Protectant, Phygon Naugets, Phygon-XL-DDT, Thiram Naugets, Thiram 50 Dust – fungicides – Spergon Wettable, Phygon-XL – insecticides – Synklor-48-E, Synklor-50-W – fungicide-insecticides – Spergon Gladiolus Dust, Phygon Rose Dust – miticides – Aramite – growth retardants and herbicides – MH-30, MH-40 – pre-emergence weed killers – Alanap-I.

educational aids help you sell toxaphene



Among the many free educational aids now being made available by Hercules to farmers and others concerned with the control of harmful insects, are three new films. All are 16mm., in sound and full color:

"*The Pollination of Alfalfa*" shows how seed production can be greatly increased through cooperation between growers and beekeepers. Running time: 25 minutes.

"*The Alfalfa Weevil and Its Control*", filmed in Utah during last year's infestation, shows how farmers are controlling this insect pest. Running time: 10 minutes.

"*The Spittlebug and Its Control*" portrays the life cycle of the insect and also features interviews with farmers, with action shots of methods of insect control. Running time: 14 minutes.

Hercules films and other educational material are helping to promote confidence in toxaphene in the field. If you make toxaphene dusts or sprays, and are not taking full advantage of these sales-builders, ask for complete information.

Naval Stores Department

HERCULES POWDER COMPANY

970 Market Street, Wilmington 99, Delaware

NX53-10

Editorial
COMMENTS

IN KEEPING with assertions made by the trade that increased use of fertilizer materials is the best answer to the farmer's battle against shrinking income, the U. S. Department of Agriculture has recommended to growers that they step up, rather than reduce, their fertilization programs.

Pointing out that supplies of fertilizer materials are expected to be ample in 1953, the U.S.D.A. declares that "In relationship to prospective prices of farm products, it will still pay many farmers to use more fertilizer." Even though prices on the material may rise slightly, this still holds true, the agency continues.

Using the corn crop as an example, the Department points out that in the eastern section of the corn belt, the most profitable rate of fertilizer application per acre averages about 175 pounds of plant nutrients, or 875 pounds of a product carrying 20% plant nutrients. "This is probably ten times the rate applied on the average acre of corn in this area," it is observed.

The economics of fertilizer use, as emphasized by the National Fertilizer Association and other groups, is more than confirmed by the U.S.D.A. It points out that the farmer, short of labor, will find that at the most profitable rate of application, the yield of corn per man hour of labor is about three times as large as where no fertilizer is applied.

When fixed costs are high, it is important to give particular attention to practices that increase yields, the Department concludes.

This rather encouraging official declaration should exert great influence at the point where it is most important . . . at the consumer level. Yet, there is a job remaining for the fertilizer manufacturer and dealer to re-affirm and re-emphasize the practical economics involved in the use of plant nutrients.

Instead of a crisis arising out of the current downward trend of farm income, this situation could become a means of clinching in the growers' minds, the indispensability of fertilizer materials! But the chief selling job still rests on the fertilizer industry itself!

WITH a heavy survival of pests reported following an open winter, many in the pesticide trade are keeping fingers crossed regarding a balance between possible infestations and the supply of control materials in sight.

The over-all picture, seen through the eyes of trade executives in an article on page 30, expresses doubt that enough materials will be available in event of heavy need. Carry-over stocks are not as large as was generally believed, they say, with exception of some southwestern formulators with sizeable inventories. "There is not as much material in the field as there should be at this time of year," one observer notes, and predicts "desperate situations when the use period gets under way."

The price situation, however, has put the formulator in a position where he is not inclined to do much toward correcting the supply picture. It's natural for him to wait and see.

Weather favorable to insect development will set the pesticide trade to scrambling. But will such action be in time to do any real good? *That* is the question.

Despite Snafu in Trade.....

PESTICIDE INDUSTRY OPTIMISTIC

WITH seasonal insect infestations starting to be reported from various parts of the country in rather heavier than normal volume, agricultural insecticide manufacturers are beginning to believe that demand for insecticides may be considerably heavier this season than had been anticipated. With a generally mild winter over a large part of the country, high survival rates are reported for many annual pests. This, added to the fact that large numbers of many pests went into hibernation last fall, seems to indicate that 1953 may produce rather heavy infestations, which could bring exceptionally large demand for insecticides as the season develops.

The unknown factor, as it always is this time of year, is anticipated weather over the coming two months. If normal rainfall develops, there will be insects in heavy volume. If last season's drought recurs, the trade will face another season like 1952,—with no pests and no market. The situation was well summarized by a U.S.D.A. official in private conversation a few months ago, who predicted "If we get enough moisture to make a crop, I'll guarantee there will be bugs on it."

Pricewise, there seems not too good a prospect of a normal profit year in '53, even if heavy infestations materialize. Liquidation of stocks carried over from last season, at prices at or below cost, is reported continuing. Thus, even if demand picks up, and a substantial volume of insecticide is needed for this year's crops, profit margins may still be so unfavorable as to leave this a poor year. There is the further unfavorable factor that dealers, distributors and users, right down the line, have been slow in ordering, so that even should materials soon be needed in heavy volume, they may simply not be available where and when needed, and thus sales may be lost.

AGRICULTURAL CHEMICALS has attempted to survey the general picture as of May 1, to give our readers a representative view of what conditions face the industry over the country as the new growing season gets under way,—what the early reports are on insect infestations and demand for insecticides, what the stock situation is, what the price picture is, etc. The replies, a selection from which follows, will, we believe, make very interesting reading.

Pest Potential Great

TO set the background against which these observations of industry representatives should be interpreted, it would first be in order to read the comments of Kelvin Dorward in this issue, pages 93 and 95. He reports that the boll weevil has overwintered in heavy numbers, the survival rate having been very high because of the mild winter.

From Texas comes the report of a cutworm invasion labeled "the worst in years." In Dallas, County Agricultural Agent A. B. Jolley feared the cutworms would move from grain and clover into corn and cotton. Meanwhile rain was increasing the severity of the infestation, and hampering insecticide application operations.

From Illinois came a report from H. B. Petty, extension entomologist, State Natural History Survey,

Survey by Agricultural Chemicals indicates demand for pesticides could be heavy. Acute need for supplies may come suddenly if weather favors development of large numbers of insect pests which survived winter.

that aphids and clover leaf weevil are abundant in many clover and alfalfa fields throughout central and western Illinois. Damage to some fields has been alarming, he reported, and immediate treatment is indicated. The following report from the southwest gives some comments on the particullar situation existing in that area:

"Generally over the Southwest (Texas, Oklahoma, Arkansas and Louisiana) with the exception of the South Plains of Texas, we have had favorable moisture conditions and are still getting some timely rainfall. Of course, this makes the situation look a lot better so far as producing a good crop and having an abundance of insects are concerned.

"Cutworms and armyworms have already appeared in pastures and many of the cover crops, such as clover and vetch. We have also had some infestations in wheat an dother grain crops. Currently insecticides are being applied or have been applied for the control of these insects on several thousand acres. At the moment we are either dusting or spraying to control worms on vetch in the six or seven county area in Texas, East and Northeast of Dallas. Also, armyworms are beginning to build up in oats in Arkansas.

"Of course, cotton is the big deal in this area and perhaps the largest outlet for insecticides of any single crop in the world. It is estimated that we will plant approximately 12,000,000 acres of cotton during 1953 in Texas. The acreage in the other three states which we cover will bring this total to approximately 15,500,000 acres.

"Pink bollworms have already started to appear in the Lower Rio Grande Valley, and there is every indication that this insect will be as much of a problem as during 1952. Unfortunately, growers in the Rio Grande Valley are not doing a complete job of controlling insects early, and boll weevils seem to be increasing there.

"Owing to the mild winter a high survival is expected for most cotton insects in all areas of Texas, particularly the boll weevil where that insect normally occurs. According to C. R. Parencia, Entomologist-in-Charge of the U.S.D.A. Waco Station, over wintered weevils have already been found in considerable numbers in some fields in the upper Coastal Bend region and as far north as McLennan County. A large number of boll weevils have been found in the important cotton growing area of the Louisiana-Arkansas-Mississippi Delta. In fact, the number found there is about one and a half times the average found during the past seventeen years and approximately twice as many as were found at this time last year.

"Insecticide companies that manufacture a consumer product seem to have adopted a 'wait and see' attitude. Some raw materials are being shipped to processors but, in my opinion, the quantity is not adequate to protect against the indicated strong demand during the next two to three months. Undoubtedly there is a lot of insecticide material, either in finished form or as raw materials, in storage throughout this section, but it is quite probable that the job of getting the right material to the right place at the right time may be impossible during the height of the season.

"Assuming that moisture conditions continue to be favorable, I believe that there will be a strong demand for insecticides for the control of agricultural insect pests during 1953. The need for insect control in agriculture will probably be as great as at any time during the past ten years. In other words, as I see it, we can look forward to a tremendous job of distribution during the actual consuming season because very little insecticide will be in the hands of dealers or on the farm when it is needed. We all know that to be a few days late may be too late to control insects.

"Insecticide prices now are substantially lower than during this time of any year since I have been in the agricultural insecticide business. Generally prices are about the same as they were last year after it became obvious that the severe drought would make it a poor year so far as insecticide sales were concerned. Some insecticides are still being sold below cost. There is a tendency also on the part of some manufacturers to by-pass the dealer or distributor and sell directly to the grower. In most cases, however, where there has been a demand at the consumer level, prices have recently had a tendency to firm up at a reasonable level."

Texas Expects Bugs

THE observations above are generally corroborated in the following communication, also from an insecticide manufacturer from the Texas area:

"The stands of cotton are generally very good with a very large acreage planted. The weather has been very dry and windy, resulting in a rapid deterioration of the crop. We have a minimum of insects, although we have everything in the book present in the fields which means we should have a good insecticide season if the rains come in time. The dry weather has affected sales to an extent, and no one is buying ahead pending weather developments. Sales have been rather slow, with everyone buying for immediate needs only. The price structure of insecticides is in a demoralized state and I am afraid will stay that way unless we have general rains and have a resulting large movement. In short, everything depends on timely rains and the volume of business for this season will be in direct ratio to the amount of rainfall within the next two weeks. To sum the situation up, it seems to me that big rains mean big business and a chance to make some money, but with dry weather we will be 'sunk'."

(*Turn to Page* 117)

Recent Advances in Chemical Weed Control

WEEDS are the most expensive items on American farms. The American farmers' annual debt due to weed losses has now reached an estimated five *billion* dollars.[3] The losses caused by weeds are estimated as second only to the farm losses caused by soil erosion.

How Weeds Cause Losses

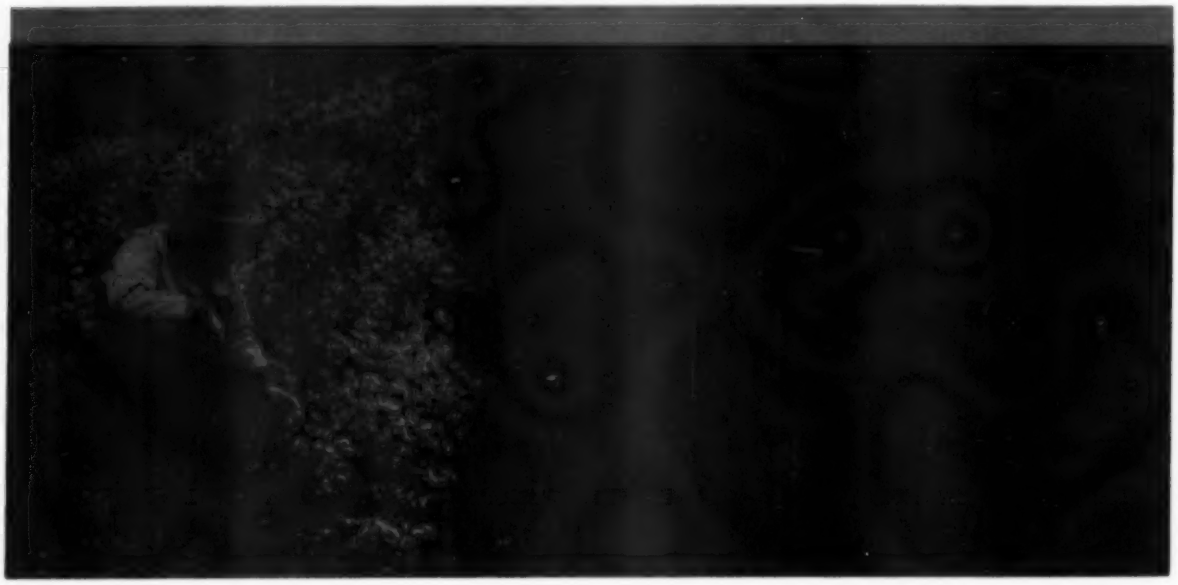
IN competing with crops for water, light, and mineral nutrients, weeds increase the cost of labor and equipment, reduce the quality of farm products, reduce the quantity and quality of livestock products, harbor insects and fungus diseases, and impair the health of livestock and humans.

The average ragweed plant has a water requirement 3 times that of corn. One plant of common mustard requires twice as much nitrogen, twice as much phosphorus, four times as much potash and four times as much water as a well developed oat plant. The average cost of tillage on cultivated land is estimated at 16 percent of the value of the crop produced. One-half of the tillage required is due to the presence of weeds. This means that on each acre of cultivated land growers are losing at least 8 percent of the value of the products produced, due to the presence of weeds!

It is not surprising that after twelve years of selective chemical weed control research in North Dakota, Bolley should write in 1908 as follows: "When the farming public has accepted this method (selective chemical weed control) of attacking weeds as a regular farm operation, the gain to the country at large will be greater in monetary consideration than that which has been afforded by any other single piece of investigation applied to field work in agriculture."

Photo Below

A classic example of how the application of chemical herbicides controls unwanted plants in grain. Selectivity of materials is becoming more and more of a tool for agricultural use. Here, mustard was controlled in wheat with ¼ pound of 2,4-D. Material cost was about 2½¢ per acre. — USDA photo.



by
W. C. Shaw
and
R. L. Lovvorn[1]

Chemical Control Develops

HOW well have Bolley's predictions been fulfilled? Little progress was made in the practical use of weed killers until the latter part of the nineteenth century. Then, with amazing rapidity, the science of chemistry began to make real contributions to weed control research. The introduction of Bordeaux spray for the control of plant diseases stimulated interest in the use of chemicals. The selective herbicidal action of copper salts on broadleaved weeds in cereal crops was discovered accidentally and independently in France, Germany and the United States around 1900. This discovery was the real beginning of selective chemical weed control in the U. S.

By 1910 it was also shown that solutions of sodium nitrate, ammonium sulfate and potassium salts were also successful as selective herbicides and the use of chemicals for the control of mustard and other grain field weeds soon spread.

During the decade 1915-1925, the acid arsenical spray, carbon bisulfide, sodium chlorate and other chemicals were introduced as herbicides. Then during the past 25 years, fantastic progress in the field of chemical weed control has been made. However, it is only within the past 10 years that the most outstanding advances have occurred. Within this period, many new chemicals and new weed control techniques have been developed which are as sound and scientific in their basis as are those used in the fields of entomology, pathology, bacteriology and mineral nutrition.

Three of the most important developments in weed control in the past decade were the discovery of the herbicidal properties of 2,4-D, the introduction of pre-emergence weed control and the development of the technique of low gallonage application.

Recent Achievements

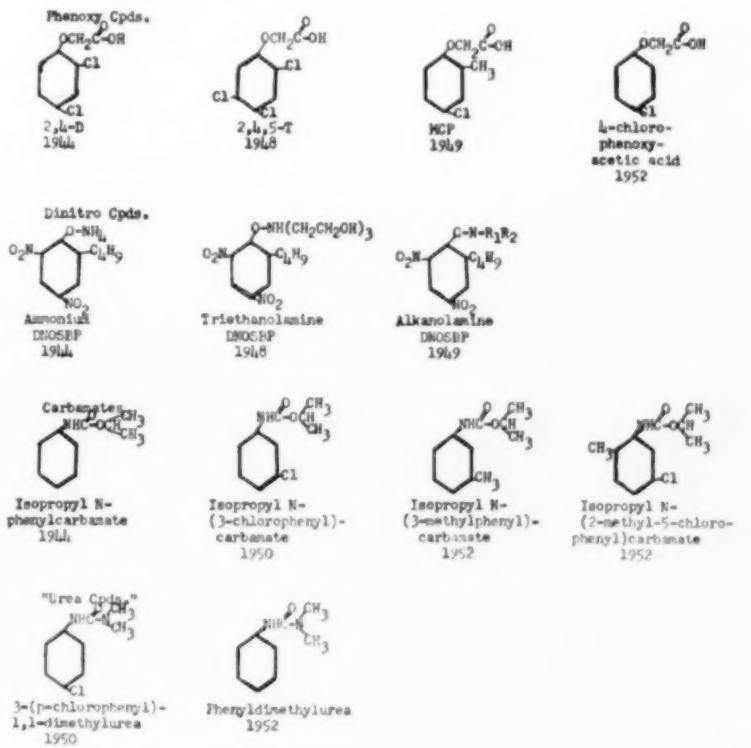
WHAT have these discoveries meant in the way of practical weed control? Both fundamental and applied studies have produced valuable results which indicate that the correct use of chemicals can aid greatly in reducing annual weed losses. Chemical weed control will supplement, not replace, improved cultural practices. As selective herbicides come into wider use in crop production, larger yields, better harvesting methods, a greater degree of mechanization and fewer losses will prevail.

Herbicides are efficient, economical weed control tools. However, the grower is confronted with a precision technique which requires the best and latest information available for successful use. No chemical so far available for use in crops, will kill all the weeds without injury to the crops.

Good, clean seed is a sound starting point for any weed control program. Thorough seedbed preparation, followed by clean, efficient, shallow, timely cultivation, has an extremely important place in weed control. There are no substitutes for proper fertilization and management of adapted species, varieties or hybrids of crop plants.

Regardless of these facts, chemical weed control is rapidly becoming more and more specialized. We cannot recommend a chemical for every weed or crop, but we are tending greatly to increase the number of herbicides used and to use each for very specific plants or purposes. This

TABLE I



[1]Agronomist and Head Agronomist respectively, Division of Weed Investigations, BPISAE, USDA, Beltsville, Md.
Document 103, Manpower, Chemistry, and Agriculture Staff Report. Committee on Labor and Public Welfare. 82nd Congress.

specificity of chemicals to crops and to weeds means that a wide variety of fundamental and applied research studies must be conducted to determine the place of a particular chemical in the field of weed control.

In order to pool the information available, weed workers from state, federal and industrial organizations meet in four regional conferences annually to discuss the latest developments in weed control. Table 2 (Pages 34 & 35) indicates some of the recent weed control practices that have been developed by the combined efforts of state, federal and industrial weed research scientists. Space does not permit a full listing of the practices developed.

At present we are using well over 30 million pounds of the phenoxy compounds—2,4-D, 2,4,5-T and MCP annually. During 1950 and 1951, approximately 25 million acres of agricultural lands were treated annually with 2,4-D for weed control. According to a survey by the Bureau of Agricultural Economics, 18,500,000 acres of small grain were treated with the same herbicide for weed control in 1949. Approximately 4,725,000 acres of corn were also treated according to the survey. Some 400,000 acres of mesquite are being treated annually with 2,4,5-T.

In 1952, it was estimated that nearly ¼ million acres of cotton were sprayed for weed control. Although some difficulties were encountered, growers were able by the use of herbicides to reduce the cost of production in some cases as much as 10 cents per pound. Increased use of herbicides in cotton is expected.

These examples illustrate some of the uses being made of chemicals for the control of weeds.

While the greatest increase in the use of herbicides has involved the newer chemicals, the use of the "old timers"—sodium chlorate, the borax compounds, and the arsenicals has also increased. The increase in the use of the "older chemicals" at a time when newer compounds were making phenomenal gains is further evidence of the increasing interest in the use of chemicals for controlling weeds.

TABLE II

Crop and Time of Treatment	Chemical, Rate Per Acre, and Volume of Application	Weeds That Are Controlled	General Comment
Corn and Sorghum Pre-emergence	2,4-D ester: 1 1/2 to 2 pounds in 20 gallons of water.	Annual grasses and annual broadleaved weeds such as crabgrass, foxtail, ragweed, pigweed, lambsquarters, etc.	Use lower rates on loam soils. Treatment not advised on light sandy soils. Dry weather following treatment may reduce effectiveness. Excessive rain creates hazard to corn.
Post-emergence: Corn 4 to 24 inches tall	2,4-D: 1/4 to 1/2 pound in 5 to 20 gallons of water. Use esters at lower rates than amine salts.	Ragweed, pigweed, lambsquarters, field bindweed, morning glory, cocklebur, etc.	Plants may be injured if sprayed within a week after leaves unfold. Brittleness and breaking increases as plants get taller. Cultivation or wind immediately after treatment may increase injury. Some hybrids more susceptible than others.
Post-emergence: Corn more than 24 inches tall. Directed lay by sprays immediately after last cultivation	2,4-D amine: Use directed spray from drop nozzles. 1/2 pound on bases of corn stalks and weeds in the row. 1 1/2 pounds on area between rows.	Broadleaved weeds growing in association with the corn in the row and pre-emergence control of annual grasses and broadleaved weeds between the rows.	Treatment especially valuable in river bottom fields where weeds become serious between lay by and harvest. Nozzles may be arranged so that both rates of 2,4-D are applied at the same time.
Sweet Corn Pre-emergence	2,4-D amine: Same as for field corn	Same as for field corn	Same as for field corn
	DNOSBP amine: 4 to 5 pounds in 10 to 20 gallons of water PCP or its sodium salt: 5 to 16 pounds in 10 to 20 gallons of water	Annual broadleaved weeds and grasses	Heavy rains following application create a hazard to corn.
Post-emergence	Same as for field corn	Same as for field corn	Same as for field corn
Wheat, Oats and Barley Fall seeded: Post-emergence – when cereals are fully-tillered and 4 to 5 inches tall. Do not treat in seedling or boot stage	2,4-D or MCP: 1/4 to 1/2 pound in 5 to 20 gallons of water. Use esters at lower rates and amines at higher rates	Ragweed, vetch, mustard, wild radish, yellow rocket and other broadleaved weeds.	If cereals seeded to legumes a canopy of growth should be allowed to develop prior to treatment. Use only amines of 2,4-D or MCP. A reduction in stand and vigor of legumes may result. All legumes are sensitive to 2,4-D and most may be injured by MCP.
	DNOSBP, amine salts: 3/4 to 1 pound DNOSBP in 30 to 50 gallons of water if cereals seeded to legumes	Yellow rocket, ragweed, mustard, lambsquarters.	
Wheat, Oats and Barley Spring seeded: Post-emergence – when cereals are fully tillered and 4 to 8 inches tall. Do not treat in seedling or boot stage	2,4-D or MCP: same as fall seeded cereals	Same as fall seeded cereals	Same as fall seeded cereals
	DNOSBP: same as fall seeded cereals	Same as fall seeded cereals	Same as fall seeded cereals
Cotton Pre-emergence	CIPC: 1 1/2 to 3 pounds sprayed on soil behind packer wheel at planting time to completely cover 12 to 14 inch band packed by wheel. Complete coverage applications desirable but cost more. Use lower rate on sandy soils.	Will control most annual grasses and most broadleaved annual weeds for 3 to 6 weeks. Less effective on certain broadleaved weeds than DNOSBP. Does not control perennial weeds.	Some injury may be expected from CIPC if heavy rains follow application. Enlarged hypocotyls as result of CIPC injury more susceptible to infection by disease organisms. Weed control reduced by temp. of 90°F immediately after planting.
	DNOSBP, amine salts: 1 1/2 to 3 pounds on a 14 inch band. Same method as for CIPC. Use lower rate on sandy soils.	Will control most annual grasses and broadleaved weeds for 3 to 6 weeks. Less effective on certain grasses than CIPC. Does not control perennial weeds.	Vapors from DNOSBP will injure or kill cotton seedlings if temperature exceeds 85°F for 3 straight days after plants come up. Do not use when such temperatures are likely to occur. Excessive rains after treatment increase the chance of injury.
Cotton Pre-emergence	CIPC: 1 1/2 to 3 pounds sprayed on soil behind packer wheel at planting time to completely cover 12 to 14 inch band packed by wheel. Complete coverage applications desirable but cost more. Use lower rate on sandy soils.	Will control most annual grasses and most broadleaved annual weeds for 3 to 6 weeks. Less effective on certain broadleaved weeds than DNOSBP. Does not control perennial weeds.	Some injury may be expected from CIPC if heavy rains follow application. Enlarged hypocotyls as result of CIPC injury more susceptible to infection by disease organisms. Weed control reduced by temp. of 90°F immediately after planting.
	DNOSBP, amine salts: 1 1/2 to 3 pounds on a 14 inch band. Same method as for CIPC. Use lower rate on sandy soils.	Will control most annual grasses and broadleaved weeds for 3 to 6 weeks. Less effective on certain grasses than CIPC. Does not control perennial weeds.	Vapors from DNOSBP will injure or kill cotton seedlings if temperature exceeds 85°F for 3 straight days after plants come up. Do not use when such temperatures are likely to occur. Excessive rains after treatment increase the chance of injury.
Post-emergence, directed sprays. Apply 3 treatments at least 5 days apart beginning when weeds are in the seedling stage	Non fortified herbicidal oils: apply with directional spray so 2 fan-shaped patterns, horizontal to ground are directed across row so cotton foliage is not contacted. Apply no more than 3 treatments 5 days apart. Fortified herbicidal oils: Follow recommendations of manufacturer.	Controls both annual grasses and broadleaved weeds but not perennials.	Most herbicidal oils should not be applied after bark cracks begin to form. Oils are less efficient when foliage is wet. Nozzles must be set properly to avoid injury to cotton or failure to control weeds.
Cotton Post-emergence, directed sprays. Apply 3 treatments at least 5 days apart beginning when weeds are in the seedling stage	Non fortified herbicidal oils: apply with directional spray so 2 fan-shaped patterns, horizontal to ground are directed across row so cotton foliage is not contacted. Apply no more than 3 treatments 5 days apart. Fortified herbicidal oils: Follow recommendations of manufacturer.	Controls both annual grasses and broadleaved weeds but not perennials.	Most herbicidal oils should not be applied after bark cracks begin to form. Oils are less efficient when foliage is wet. Nozzles must be set properly to avoid injury to cotton or failure to control weeds.
Soybeans, peanuts, snapbeans and lima beans Pre-emergence	DNOSBP, amine salts: 6 to 10 pounds in 10 to 40 gallons water. Use lower rates on soybeans and snapbeans on sandy soils.	Annual grasses and broadleaved weeds such as crabgrass, foxtail, pigweed, lambsquarter, morning glory, cocklebur and others. Perennial weeds not controlled	Injury to soybeans and snapbeans may occur if heavy rains follow application prior to crop emergence.
Ladino clover or white clover – grass mixtures Post-emergence in late spring or summer, depending on the stage of weed growth and tolerance of clover. Young weeds are more easily killed.	[illegible] ester or amine: 1/2 to 1 pound in 5 to 20 gallons of water per acre.	Curled dock, bitterweed, pigweed, chicory, burdock, dandelion, Canada thistle, wild onion and wild garlic (3 years with at least one treatment each year necessary for control)	Chemical weed control is not a substitute for fertilization and management of adapted pasture species. Don't spray more than 1/3 of pasture area at one time. Carrying capacity will be temporarily reduced. Don't spray seedling Ladino or white clover.
Alfalfa – [illegible] [illegible]	DNOSBP, amines: 1 to 1 1/2 pounds in 20 to 40 gallons of water	Chickweed, henbit, vetch, ragged robbin, mustard, wild radish, ragweed, pigweed lambsquarters.	Apply DNOSBP when temperatures are above 50°F and there is little danger of rain for 6 to 12 hours after treatment.
[illegible]	DNOSBP, amine or ammonium salts: 1 1/2 to 2 pounds in 20 to 40 gallons of water	Same as above	

Alfalfa - pure stand Post-emergence - fall or winter. Established dormant alfalfa	DNOSBP, amine or ammonium salts: 1 1/2 to 2 pounds in 20 to 40 gallons of water.	Same as for seedling alfalfa	Same as for DNOSBP applied on alfalfa-grass mixtures.
	CIPC: 1 to 4 pounds in 20 to 40 gallons of water	Chickweed, other broadleaved weeds, and is especially effective on annual and some perennial grasses	CIPC will injure cultivated annual and perennial forage grasses and should not be used on mixed stands unless it is desirable to remove the grass from the mixture.
Perennial grasses: tall fescue, orchard grass, bluegrass grown for seed Post-emergence	2,4-D, amine or ester: 1/2 to 1 pound in 5 to 20 gallons of water	Curled dock, wild garlic, wild onion, most legumes, mustard, pigweed, smartweed, wild radish and others	Do not spray in the seedling or boot stages.
Flax Post-emergence - when flax is 3 to 6 inches tall	[illegible] or MCP, amine and ester: 1/8 to 1/4 pound in 5 to 20 gallons of water. Use esters at lower rates and amines at higher rates.	[illegible] broadleaved weeds.	Do not spray after early [illegible] through bloom stages.
	TCA, sodium salt: 5 to 6 pounds in 10 to 20 gallons water	Foxtail and other annual grasses but not wild oats.	Apply TCA for best control of foxtail when flax is not over 3 inches high
Peas Post-emergence - when peas are 3 to 8 inches and weeds are small	DNOSBP, ammonium and amine salts: 1/4 to 1 pound ammonium salt or 1 to 1 1/2 pound amine salt	Pigweed, lambsquarters, wild mustard, wild radish and other broadleaved weeds.	Applications at earlier or later stages of growth may injure peas and fail to control weeds
Sugar beets Pre-emergence	TCA, sodium salt: 5 to 10 pounds in 10 to 20 gallons water	Foxtail grasses (Setaria sp.) and other annual grasses. Does not control wild oat or perennial grasses.	TCA does not control broadleaved weeds.
Potatoes Pre-emergence	2,4-D: 1 1/2 to 2 pounds in 5 to 20 gallons water	Annual broadleaved weeds and grasses	Cultivation generally preferred but pre-emergence chemical treatments are valuable in wet weather.
	DNOSBP, amine salts: 6 to 8 pounds in 10 to 20 gallons water PCP: 15 to 20 pounds	Annual broadleaved weeds and grasses	
Carrots, celery, dill, parsnips and parsley. Post-emergence - as soon as most weeds emerge and when true leaves of the crops appear	Stoddard solvent: 80 to 130 gallons per acre	Most annual broadleaved weeds and grasses in the seedling stage	Do not spray carrots or parsnips after top root is more than 1/4 inch in diameter
Asparagus Established beds Pre-emergence before and after cutting	2,4-D: 1 1/2 to 2 pounds in 5 to 20 gallons water	Most annual broadleaved weeds and grasses such as crabgrass, foxtail, ragweed, pigweed, lambsquarters	Avoid direct application of 2,4-D to growing asparagus.
Pre-emergence before, during and after cutting following clean cultivation	SES: 2 to 4 pounds in 20 to 40 gallons of water		SES much safer than 2,4-D for direct application in growing asparagus
Pre-emergence before, during and after cutting	Cyanamid: 300 to 400 pounds per acre		
Seedling asparagus Contact pre-emergence	DNOSBP, amine: 1 to 2 pounds in 20 to 40 gallons water PCP: 6 pounds in 60 gallons water		Avoid direct application of DNOSBP to growing asparagus
Strawberries Post-emergence - for germinating summer weeds	2,4-D, amine: 1 to 2 pounds in 5 to 20 gallons of water. Not more than 3 widely spaced applications per year.	Essentially pre-emergence treatment for weeds. Controls germinating annual broadleaved weeds and grasses	Avoid application in flower, fruit, runner and bud development periods. Blakemore and others less susceptible to injury
	SES: 2 to 3 pounds in 10 to 40 gallons of water. Apply 7 to 10 days after setting new plants. Allow at least 4 weeks between repeat applications	Pre-emergence treatment for weeds. Controls germinating crabgrass, foxtail, other grasses and broadleaved weeds.	Treatment must be made prior to germination of any weeds or following clean cultivation. Treatments may be made anytime during the growing season. Dry weather reduces effectiveness. All varieties are tolerant
Post-emergence - for partially developed summer annuals	2,4-D, amine: 1/4 to 1/2 pound in 5 to 20 gallons of water	Pigweed, lambsquarter, ragweed, wild radish, mustard, etc.	Avoid treatment in flower, fruit, runner and bud development periods. Some varieties more tolerant than others
Post-emergence - during dormancy in fall and winter.	CIPC: 1 to 3 pounds in 5 to 20 gallons water.	Chickweed and winter annual grasses	Do not apply more than 3 pounds. Variety tolerance not known.
	DNOSBP, amine: 1 to 2 pounds in 40 gallons water. Two applications may be required if weeds form a canopy.	Chickweed, wild radish, and other winter annual broadleaved weeds	Avoid application before growth stops in fall and after growth begins in the spring
Woody plants Foliage applications. Treat when plants are in full leaf	2,4-D + 2,4,5-T: 2 to 6 pounds total acid equivalent in 100 gallons water. Use sufficient volume to obtain thorough, complete coverage. Use low volatile esters.	Honeysuckle, poison ivy, willows, brambles, etc.	If species are known to be tolerant to 2,4-D but susceptible to 2,4,5-T, use 2,4,5-T alone. If species are known to be tolerant to 2,4,5-T but susceptible to 2,4-D, use 2,4-D alone. Use amine salts or low volatile esters.
	Ammonium sulfamate: 1/2 to 1 pound per gallon of water. Use sufficient volume to obtain thorough coverage	Poison ivy and many other woody species	Ammonium sulfamate is less selective than 2,4-D + 2,4,5-T, but is less likely to injure adjacent susceptible crops.
Woody plants Basal treatment. Apply any time during the year.	2,4,5-T: 4 to 8 pounds in 100 gallons of oil. Use low volatile esters. 2,4-D + 2,4,5-T: 8 to 16 pounds in 100 gallons of oil. Use low volatile esters.	Most woody plants. Only very few species resistant to basal treatment	The entire circumference of the trunk or stem to a height of 12 to 15 inches from the ground should be sprayed to the point of run-off.
Stump treatment. Spray as soon after cutting as possible. Treatments at all seasons have given good results	2,4,5-T: 4 to 8 pounds in 100 gallons of oil. Use low volatile esters. 2,4-D + 2,4,5-T: 8 to 16 pounds in 100 gallons of oil. Use low volatile esters. Ammonium sulfamate: 4 to 8 pounds per gallon of water. Thoroughly wet entire stump.	Most woody plants. Only very few species resistant.	Complete thorough coverage necessary. Treatment may be made any time during the year

Future Progress & Problems

INSPECTION of Table 2 will show that every weed control practice in the table has been developed within the past 10 years. If a closer look is taken and these practices are carefully evaluated, we find that they have been developed as efficient, economical techniques, in competition with and supplementary to the best cultural weed control practices that have been developed.

One can go further and consider weed control problems almost impossible to solve without use of chemicals. Control of wild mustard in wheat with 2,4-D now seems simple, yet 10 years ago this accomplishment was impossible. The cultural practices that had been developed were practically worthless and the acreage infested with wild mustard increased annually. At present prices, the cost of ¼ pound of an amine salt of 2,4-D, the amount needed to control the wild mustard in wheat, is 25 cents per acre. At present hourly wage rates, the cost of 2,4-D to control mustard in wheat is less than the cost of walking across an acre of wheat unless the owner goes at a gallop! Other examples equally as striking could be cited. Chemical weed control is economical.

What then will determine our rate of future progress? Taking stock in Table 2 and looking to the future in Table 1, there is every reason for encouragement. The four groups of compounds in Table 1 furnish some evidence as to what we can expect in chemical weed control in the future. These four groups of compounds are adequate to indicate certain trends. It is obvious from noting the development in the phenoxy type compounds, the substituted phenols, the carbamates and the substituted ureas that we are tending to increase the number of herbicides used and to use specific compounds for very specific purposes.

The phenoxy type compounds. The successive introduction of 2,4-D, 2,4,5-T, MCP and 4-chlorophenoxyacetic acid (Table 1) indicates the developmental trends in this group

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PAUL T. TRUITT
Plant Food Council President

Program Plans Complete for eighth annual meeting of

American Plant Food Council

MEETING plans are complete for the eighth annual convention of the American plant Food Council, Inc., to be held at the Homestead Hotel, Hot Springs, Va., June 11 to 14. Speakers scheduled to appear on the program include nationally-known authorities on farm policy, Department of Agriculture programs, agricultural production tools and regional agronomic information.

The convention will begin Friday, June 12 when Council president Paul T. Truitt addresses the group at 9:45 a.m. Following president Truitt on the program will be J. Earl Coke, Assistant Secretary of Agriculture, Washington, D. C., who will describe many of the program changes and policies now under way or contemplated by the Department of Agriculture, particularly in the fields of research, extension and land use. Mr. Coke carries the administrative responsibility of the reorganization program of the Department.

Dr. T. K. Cowden, head of the Department of Agricultural Economics, Michigan State College, East Lansing, will address the group on the first morning's program.

Other speakers slated to appear at various times on the A.P.F.C. program include representatives of the Federal Government, State agricultural colleges, the agricultural press, farm organizations and the industry.

Rep. Hope to Appear

REP. Clifford R. Hope, Kansas Republican, Chairman of the House Committee on Agriculture, is scheduled to be the first speaker on the program of Saturday morning, June 12. The subject of his address has not been announced, but he is expected to discuss agricultural problems on a national scale.

Winners of awards in the "Soil Builders Award for Editors" will be announced at the meeting. This feature, a new one for the A.P.F.C., will be the culmination of

H. H. MAYNARD

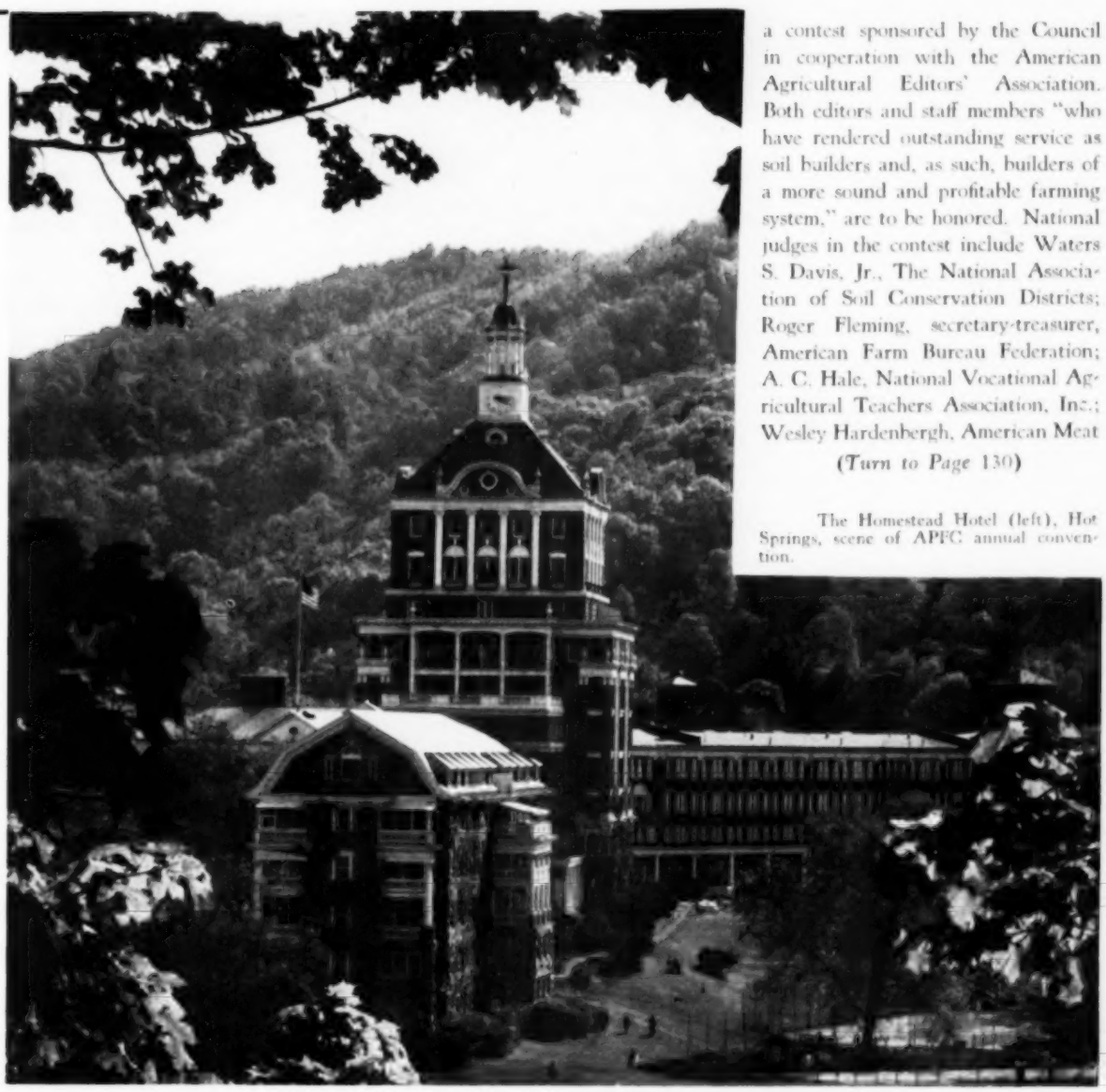
Wm. E. MARTIN

Dr. T. K. COWDEN

H. A. WOODLE

ARNOLD W. KLEMME

L. H. SMITH



a contest sponsored by the Council in cooperation with the American Agricultural Editors' Association. Both editors and staff members "who have rendered outstanding service as soil builders and, as such, builders of a more sound and profitable farming system," are to be honored. National judges in the contest include Waters S. Davis, Jr., The National Association of Soil Conservation Districts; Roger Fleming, secretary-treasurer, American Farm Bureau Federation; A. C. Hale, National Vocational Agricultural Teachers Association, Inc.; Wesley Hardenbergh, American Meat

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The Homestead Hotel (left), Hot Springs, scene of APFC annual convention.

Minor

Plant Food Deficiencies develop over many years. Minor elements supply missing nutrients in soil.

IN discussing the problem of minor elements, some of the thinking concerning these elements, should be clarified because many people seem to feel that they have magic properties or act something like a tonic. As a matter of fact, they are necessary plant nutrients and just as necessary as nitrogen, phosphorus or potash, though in most cases the magnitude of the requirements is a great deal smaller—so small, in fact, that even in scientific work they were overlooked for many years because of the inability of research workers to purify the chemicals.

From Liebig in the mid-1850's up to Maze in the early 'teens, research workers had struggled to reduce the number of salts required to grow plants in water culture to a minimum and had arrived triumphantly at the point where they could say with great assurance that only three salts, calcium nitrate, potassium phosphate and magnesium sulphate, plus a little iron, were necessary. The teaching of this went on for many years after Maze and was taught as gospel in the late 'teens and early '20's. Not many professors saw fit to mention Maze's work, which was then considered to be a form of heresy. As a matter of fact, the only difference between Maze and other workers of the period, was the fact that he was able to purify his chemicals to the extent that he could produce deficiencies of things like copper, zinc and manganese, whereas the other had not taken the infinite care necessary with the chemicals and glassware of those days to reach that stage of purification.

Even before Maze's time, some progress had been made, though it was little noticed. In the mid-'80's, zinc was recommended as an addition to culture solutions for *Aspergillus niger* when this fungus was used to produce citric acid from sugar. As early as 1892, zinc sulphate was recommended for corn by Javillier in France, but again the work went unnoticed and unapplied and it was not until about 1931 that minor elements began to be used on a large and ever increasing scale.

In order to understand why this was so, it should be pointed out that there were certain contributing problems which prevented deficiencies showing up on a large scale at an earlier date. One of these reasons was the widespread use of organic fertilizers and this whole problem has a considerable relationship to the now very controversial problem of organic gardening. Actually, in the early days in Florida, organic nitrogen and organic phosphate showed a pronounced advantage over inorganic nitrogen or phosphate. This was generally credited to the problem of slower availability, which permitted a higher percentage use of the applied material. We were able to prove later that the reason for the advantage shown by organic fertilizer materials lay primarily in their content of magnesium, manganese, copper, zinc and other minor elements, rather than in any fancied efficiency of the material as the source of the element for which it was theoretically applied.

As a matter of fact, long-time experiments with citrus on the sands of Florida have shown rather conclusively that an organic material like castor pomace is actually less efficient as a source of nitrogen for citrus trees than materials like nitrate of soda, sulphate of ammonia or ammonium nitrate. However, when no minor elements are added, the organic material will show a pronounced advantage over the others because of the trace of needed elements which it contains. It was only when organic fertilizer materials began to become short and were substituted for by inorganic sources low in impurities that deficiencies began to show up on a large scale.

Actually, today, you could grow very excellent citrus on a fertilizer made up of a variety of organics such as the old fashioned tankage, bird guano from Peru, bone meal and low-grade sulphate of potash, such as we used to get from Germany. Such a fertilizer would contain fairly adequate quantities of the so-called minor elements, but its cost in this day and time would make it prohibitive for anybody except a backyard gardener. Even then, a properly balanced fertility program supplying all of the needed minor elements either in the fertilizer or sprays, would surpass the best organic mixtures that were ever available in Florida or elsewhere.

Minor Element Needs Evident

THIS organic problem with its traces of minor elements goes further than the problem of fertilizer materials, however, and is related to the litter left by the natural forests. These natural litters usually contain considerable amounts of the minor elements and typical examples of the relationship of these things to the production of crops can be cited. In Florida, when the tung tree was introduced from China and planted on a large scale, it grew well if planted on newly cleared land, but on adjoining, old corn and cotton land the growth was poor and the death of the tree frequently occurred the first or second year.

These results were extremely marked and were eventually explained by research work which showed that the failure of the tung trees to do well on the old corn and cotton land was due to the fact that these lands were deficient in zinc in a form available to the tung tree. The soils involved were usually fairly high in total zinc and investigations re-

Element Problems

by
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Paper presented at meeting of National Agricultural Chemicals Association, New Orleans, La., March 13, 1953

vealed that the native growing plants apparently were able to take zinc from the minerals in the soil and leave it in organic form in the litter that they produced. This supply of available zinc had been exhausted completely in the old lands which had been cultivated for forty or fifty years.

This, incidentally, led to the clarification of another related problem with corn. On these old soils, the farmer had learned that he could grow corn only every second or third year and that he had to let weeds grow during the intervening time—so that on the better soils, you could grow corn one year, weeds the next and corn the second year, but on the poorer lands, you had to let the weeds grow for two years. A chemical examination of the weed composition showed a very high content of zinc, whereas corn, which has a comparatively low requirement, was unable to meet that requirement and white bud resulted. But if you grew corn following weeds, it apparently could obtain a sufficient supply of zinc from the decaying weeds. It was found, however, that the addition of ten or fifteen pounds of zinc sulphate per acre in combination with the usual nitrogen, phosphorus and potash would enable corn to be grown every year and grown better than by using a crop of weeds as the source of available zinc.

In Australia, it was noted that a certain type of pine could not be grown in a nursery on old cultivated land unless litter were hauled in from the forest. Later on it was found that by spraying the seedling pines with zinc, the same result could be gained without the litter.

This, in our opinion, is a very real factor in interpreting the situation and workers in many areas who insist they have nty of these elements may find that as the forest organic matter disappears, deficiencies of various types will appear in increasing amounts.

Purer Chemicals Factor

ANOTHER factor which has entered into the picture is a steady purification of chemicals and in the case of potash, for instance, old experiments in Florida showed that low-grade sulphate of potash, which contained from 2-8% magnesium, and the old kainit which contained about the same amount of magnesium, were the best sources of potash for citrus. With the development of information, it was easy to demonstrate that the same thing could be done with high-grade sulphate or muriate of potash that could be done with kainit or Leuna saltpeter if an equivalent amount of magnesium were added to the pure product. Chemists are very prone to look on purity as a criterion of quality and to try continuously to increase the purity of the chemicals; but many times the purification tends to benefit the researcher more than the farmer.

For several years, Florida was considered a "freak" area with regard to minor elements and considerable fun was poked in certain quarters at practices that became standard in Florida by the mid-'30's. Actually, Florida was forced into this program of research and use mainly by circumstances, the circumstances being a soil that was remarkably deficient in practically every plant nutrient, plus an early change to inorganic phosphate and nitrogen.

As a result, we were confronted with the necessity of changing our practices or losing a larger part of our citrus industry. Our store of forest litter or forest soil was very scant, due to the light soils and the regular burning of the woods, and what little was left when the forest was cleared was rapidly consumed or leached out under the tropical conditions existing in Florida. In the cooler zones, where the destruction of the forest soil or organic matter is slower and where the soils were naturally richer in minerals, the development of these deficiencies is much slower and in many areas no evidence of deficiencies have yet appeared. This does not mean that they will not appear eventually, because as we farm the land year after year, the reserves left by the forests will gradually disappear and our use of inorganic fertilizer materials in the nitrogen, phosphorous and potash class and without adequate amounts of minor elements as impurities, will

eventually lead to the development of many deficiencies.

Some of this evidence is already appearing. New Jersey, for instance, is becoming a center of research on minor elements because it has much the same soil conditions in many areas as Florida. Some peach growers in North Carolina are now using zinc, manganese and magnesium in their peach fertilizer, with what they believe to be highly beneficial results, and boron and magnesium are being used in a routine way on apples in some sections. In the tropics, deficiencies of zinc, boron and perhaps some other elements have become a controlling factor in the production of coffee on very old coffee lands in the highlands.

In Brazil, where a tremendous amount of coffee is produced it has been grown for many generations on new land. The tropical forest is cut down and the land planted to coffee. At that time, it has about a foot of high organic soil with an exchange capacity that may run up to 40 m. e. and a satisfactory supply of available elements of almost all kinds and varieties. Somewhere around twenty to thirty years of age, the coffee plants start to decline and the coffee producer moves on to new lands.

The supply of new land in the province of Sao Paulo has been exhausted and now the province of Parana is being developed, but this is not inexhaustible. Moreover, the problem of what to do with the land after coffee becomes acute, because the organic soil has disappeared and the soil left has a very low phosphate content and a tremendous fixing power for it. It is also extremely low in available zinc and copper and a fertilizer program will have to be developed to take care of the situation if this land is going to be used at anything like the profit that was attached to coffee.

Actually, within a generation it may be necessary to develop a fertilizer program which will enable people to produce coffee on the old soil that is left, because the supply of new soils will have disappeared at altitudes and in climates suitable to coffee.

More Deficiencies Due

IT seems reasonable to assume that within the next ten to twenty years, evidences of deficiencies will become widespread and the use of some or all of the elements will be necessary in many areas. Possibly one of the factors that will help this, outside of the turn to inorganic fertilizer materials, will be the tendency to the use of introduced cover crops rather than native cover crops. There is a good deal of evidence that native cover crops are able to use the native minerals quite efficiently but ofttimes the introduced cover crop has little ability to use these and may not have even much of a requirement for them.

In the case of Florida, again, the use of Crotalaria in alternate years between corn crops was not nearly as satisfactory as the use of native weeds, because while the native weeds accumulated large amounts of zinc, the Crotalaria accumulated extremely small amounts and insufficient to produce a crop of corn.

It seems that we slavishly follow "tonnage of organic matter" produced by cover crops as a criterion to their value, without ever examining very critically the composition of the organic matter produced, and this is perhaps the most important point of all.

At the present time, in many citrus groves in Florida, it is necessary to supply magnesium, manganese, copper, zinc, boron, molybdenum and iron, in addition to the nitrogen, phosphorus, potash, calcium and sulfur incidental to the common fertilizers. This program thus includes all of the known elements needed for plant nutrition and perhaps not many areas will have to use such an imposing list at any near future time—perhaps never. Other areas, however, have little better soil than Florida and may expect eventually to have to use most or all of these — not within a year perhaps, but within ten to twenty years. These are the things being removed in crops, and what is taken out must be returned eventually. Reserves may last many years, but eventually the deficiencies will appear.

If people can be taught to understand the basic principles involved, there will be less resistance to the changes in fertilizer practices as they become necessary. A continuation of the idea that minor elements are magic potions and will accomplish marvelous things under any conditions, is a handicap to the entire sensible development of the program. We have, for instance, no evidence in Florida that luxury consumption beyond the need for any of these elements will accomplish anything valuable.

The correction of a deficiency may increase cold resistance to a point where the grove will go unharmed when the adjoining, deficient grove is killed back to stumps; it will increase the sugar content of fruit as well as the vitamin content and the general over-all food value. But adding more than the plant needs may do harm by toxicities or by antagonistic action toward other elements, thus producing other deficiencies. In other words, minor elements should be used where they are needed and there only.

Progressive Defiencies

DEFICIENCIES will increase as time goes on, in many crops and on many soils. It should be pointed out that if these are recognized, studied and the proper treatments devised, production can be maintained and improved. Failure to recognize them and proceed sensibly, will only play into the hands of the organic gardeners for they hold the alternative, though more expensive, answer to the problem. It is the duty of the research men in Experiment Stations and industry to study this problem and to provide the answers, and it is up to industry to provide and sell the proper materials, and to both to educate the farmer concerning the problem. This is the sensible program that tends to eliminate the "sharpies" with the trick cures.

A *complete fertilizer* is not necessarily nitrogen, phosphorus and potash only, but it should also comprise all of those elements needed by a crop and deficient in the soil on which it is growing.

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Biological and Taxonomic Aspects of

MITE CONTROL

by
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MITES that feed on agricultural crops have become of increasing importance during the past few years. Many workers have found that the use of organic insecticides seems to be primarily responsible for the increased mite problem, although some maintain that the newer chemicals are so effective in the control of insects that they merely provide a new interest in mites.

A number of entomologists have observed that spider mites may actually increase following the use of DDT and other organic insecticides. Observations made by Michelbacher and Middlekauff (unpublished) during 1952 illustrate this point. Where aldrin, dieldrin, and heptachlor were applied to their field plots for melon insect control in California, plant damage by the Pacific spider mite was very serious in comparison with the checks. For example, in their dieldrin plots, there was an average of 28 mites per 15 mm. circle sample of melon leaf, compared with an average of two mites per sample in the checks. The melons treated with dieldrin alone were reported as a total loss due to mites.

Again, where very heavy applications of parathion were made to California strawberries for control of the cyclamen mite, William W. Allen (unpublished) reports that the two-spotted spider mite became very serious in comparison with untreated portions of the fields. He obtained an average of 54 mites per 25 mm. circle sample of leaves from parathion treated plants in contrast to an average of one-fourth mite per sample in the checks.

In many cases the newer organic chemicals are known to affect adversely the insect predators of spider mites. The insect enemies of the mites differ considerably in importance on different crops and in different areas.

Predaceous mites may keep spider mite populations in check, but they have received little attention until recently. A great deal of biological and ecological work is needed in connection with the predatory mites, and the economic entomologists must evaluate more carefully the effect of chemicals on their populations.

In many cases, a destruction of the predators is not obviously implicated in the build-up of spider mites that follows the use of organic chemicals. For instance, E. C. Klostermeyer (unpublished) reports that heavy applications of DDT, BHC, and aldrin to the soil alone caused increased populations of the two-spotted spider mite on beans and potatoes.

Several workers have reported that DDT is actually detrimental to the two-spotted mite, inasmuch as it may cause an initial decline in reproductive potential, some mite mortality, and reduced longevity of the mites. D. W. Davis (1953) found that DDT-coated leaf surfaces were irritating and repellent to the two-spotted mite. Davis postulates that the repellency causes the mites to spread rapidly over the plant, thus avoiding a drop in reproductive potential due to overcrowding and thus more easily avoiding their natural enemies.

Regardless of the reasons involved, there is ample evidence that spider mites have assumed a more important rôle in economic entomology today than heretofore.

Different Mites Involved

SPIDER mites, previously unknown or seldom encountered, have become serious pests since the organic insecticides came into use.

The Atlantic spider mite was first noted in 1939, on cotton in California. Gordon L. Smith (unpublished) reports that because certain infestations were so unusual that year, considerable controversy was raised over whether or not it was the two-spotted spider mite. *Tetranychus atlanticus* (McGregor) was not described until 1941, nor are early collections of this species known. However, during the past ten years, the Atlantic spider mite has become one

of the major pests of low-growing crops in California.

Eotetranychus lewisi (McGregor) and *Eotetranychus sexmaculatus* (Riley) might be cited as other examples of mites that have become of concern only recently. The Lewis spider mite was described in 1943 from California citrus, but only in the past several years has it become an economic species. Similarly, the six-spotted mite has become the most serious pest of California avocados during the past several years (Pence, 1951), although it was first recognized on this host in California in 1946. *Eotetranychus uncatus* (Garman) is still another example. This species was first recognized in 1949, but it has been found to be an important pest of apples in Massachusetts.

It is probable that much of our lack of knowledge of individual species of spider mites in the past was due to the laxity of entomologists in submitting specimens to the taxonomic specialist. This is possibly the main reason that *Tetranychus canadensis* (McGregor) was recognized and described only recently, although it is wide-spread throughout the eastern and mid-western states on agricultural crops.

This factor does not seem to apply, however, in the case of *Tetranychus mcdanieli* (McGregor), a species that was described from Michigan raspberries in 1931. The next available record for this species is from Utah raspberries in 1948. However, the McDaniel spider mite has almost replaced the Pacific spider mite in the Yakima and Wenatchee fruit growing areas, following the widespread use of parathion. *T. mcdanieli* has also become very recently the dominant spider mite in other local fruit-growing areas of the West Coast where parathion has been used extensively.

The shape of the aedeagus is the only distinguishing character between *Tetranychus mcdanieli* and *T. pacificus*, and the types are quite distinct. The distinction has become less obvious following the study of a large number of recently collected specimens. There is a possibility that the two forms were originally allopatric subspecies, and that man, with the introduction of *T. mcdanieli* to the West Coast and with the widespread use of chemicals for controlling *T. pacificus*, has inadvertently created a new problem.

Since unfertilized females of *Tetranychus* produce only males, there can be a great deal of significance attached to mating studies between the two forms. The presence of females and an F_1 cross between *pacificus* and *mcdanieli* would indicate that the two forms are interfertile, but interbreeding would need to be carried for several generations to determine whether any degree of physiological isolation is evident. Such mating studies are needed.

Greater attention needs to be paid to taxonomic detail, author says. Lack of knowledge of individual species can allow them to infest wider areas. Mite resistance caused in part by marginal lethal dosages of pesticides, Mr. Pritchard states.

Mite Resistance

IT is natural that problems of mite resistance to chemicals might first be encountered under greenhouse conditions. The warm temperatures that encourage maximum year around reproduction, and the constant use of chemicals by the commercial greenhouse florist, encourage an early expression of resistance. The use of marginal lethal dosages of liquefied-gas aerosols and spray materials has also contributed to the early resistance of the two-spotted spider mite on greenhouse floral crops.

Many observations have been made that hosts may differ considerably with regard to the mite populations that they support. Floriculturists have long maintained that the two-spotted spider mite is more difficult to control on roses than on other greenhouse crops. The recent studies of Rodriguez (1952) bear also on this subject, since he showed that mite populations vary considerably with the nutrition of the host plant. For example, more than three times as many mites developed on the low nitrogen foliage as on the high nitrogen foliage under his experimental conditions.

With regard to the newer acaricides, however, highly resistant strains of the two-spotted spider mite occur in commercial flower ranges, the resistance being to azobenzene, the organic phosphates such as TEPP, parathion, "Dithion" (sulfa-TEPP), malathon, and OMPA as well as "Aramite." The wettable powder of "Geigy-338" has given good control of resistance mites, along with good plant tolerance in California greenhouses. The wettable powder of "General Chemicals-876," a close relative of "Dimite," has also given good control of resistant mites and usually good plant tolerance. However, the laboratory studies of R. N. Jefferson (unpublished) indicate that mites resistant to the organic phosphates and "Aramite" are also somewhat resistant to "Gen. Chem.-876." Other chemicals tested are more injurious to California floral crops.

The best indication of resistance in the field has been encountered

in the fruit growing areas of Washington where the European red mite, *Metatetranychus ulmi* (Koch), has become noticeably resistant to parathion (Newcomer and Dean, 1953).

It is obvious that field entomologists should be on the alert for resistant mites, and that mite control problems will continue.

Taxonomic and Biological Problems

ATTENDANT with the greater emphasis on mite control, increased attention has been given to taxonomic and biological problems. One of the most important of such is that involved with *Bryobia praetiosa* Koch, sometimes known as the clover mite or, in California, as the brown almond mite.

Males are unknown in this species, and it appears reasonable that a single mutant female may possess small morphological or physiological differences that will render all her progeny somewhat different from the parent. There is no way of cross-breeding sexes to determine the characteristic of progeny.

Bryobia praetiosa, as recognized by modern taxonomists, not only presents morphological differences, but also biological differences. It is important for the agricultural entomologist to know that this mite has only three generations in the spring on almonds in California (Summers, 1950), but that it may continue reproduction throughout the season on apples and other fruit trees, or throughout the year on ornamentals such as ivy.

An interesting example of how knowledge of the biology of a plant-feeding mite may be imperative for the economic entomologist is illustrated by *Bryobia praetiosa*. Many of the experimental results with acaricides for control of this mite have been based on leaf counts of the mites before and after treatment. We now know that such counts may bear little relation to actual population densities. Biological studies by Summers and Baker (1952) showed that *B. praetiosa* is an intermittent feeder that has alternating periods of residence on the leaves and on the twigs. Moreover, only a small part of the entire population of active mites may visit the leaves when external conditions are conductive to feeding.

Thus, the entomologist taking leaf samples to make mite counts is sampling only a portion of the population present, Furthermore, counts made on leaves collected during cool morning hours will be entirely different from counts made on leaves during a hot and bright afternoon.

Summers also showed that there is an interesting correlation between the character of the bark and internodes of a given variety of almond, and the *Bryobia* populations that the trees can support.

The brown wheat mite, *Petrobia latens* (Müller), is similarly a cosmopolitan species of agricultural significance, and males are unknown. This species does not present the morphological differences exhibited by *Bryobia praetiosa*. However, it is noted that Fenton (1952) regards the brown wheat mite in Oklahoma as a strictly dry weather pest that disappears with rain; whereas this mite reproduces with the winter rains in California, and disappears with the summer drought. Perhaps this mite needs more biological study.

R. L. Cagle has recently undertaken an interesting problem. He has encountered what appears morphologically to be the citrus red mite, on raspberries in Virginia. The mite coloration and the seasonal habits resemble those of the citrus red mite. However, laboratory cultures of Cagle's mite have consistently refused grapefruit, and it has been noted that the guy fibrils that are characteristic of many eggs of *Metatetranychus citri* (McGregor) are absent. The taxonomist is not willing to provide new names for biological discrepancies, and it is fortunate that a scientific name is available for the raspberry mite until its true status is determined.

The two-spotted spider mite of North America presents a notorious taxonomic problem. In agreement with most other acarologists, Dr. E. W. Baker and the writer regard the common spinning mite of Europe as the same species.

Actively feeding females of the genus *Tetranychus* are usually either greenish or carmine, and one or the other coloration is constant in all species referred to the genus. The two-spotted mite, however, possesses both color forms.

The taxonomist is, so far, unable to differentiate morphologically the carmine and the green forms of the two-spotted spider mite, except for certain females of the carmine form that have several extra setae on each of the fore legs. Davis (1952) showed that inheritance of these extra setae is dependent entirely on the mother, and his cross-breeding studies indicated that no species difference is involved as far as the carmine form is concerned.

However, the cross-mating experiments of Keh (1952) indicate that at least subspecies are involved between the green and carmine forms. He was able to obtain readily an F_1 generation by crossing the two color forms, but was seldom able to obtain other generations by inbreeding the first progeny.

It is of practical significance that the carmine and the green forms may react differently to acaricides. Neiswander *et al.* (1950) showed that the green form was much more resistant to the chemicals they used, and considerable differences were found by Reynolds *et al.* (1952) with a large number of acaricides tested.

In addition to the complicated taxonomic problem involving the two-spotted spider mite, it is important to note that the nomenclatural problem is also complex. Most acarologists agree that Linnaeus, 1758, included two very different species in his description of *Acarus telarius*. There has been no subsequent agreement as to which of these mites the name should apply. Consequently, several different names are in use for the two-spotted mite.

It should be sufficient here to point out that the name *Tetranychus bimaculatus*, appropriate and acceptable as it might be in the United

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DR. RUSSELL COLEMAN
President, National Fertilizer Ass'n.

It's to White Sulphur Springs for 28th annual

NFA Convention

June 15 to 17 are dates set for 28th annual convention of National Fertilizer Association. Greenbrier Hotel is expected to be full to overflowing with fertilizer tradesmen from all over U. S.

COME June 15, the National Fertilizer Association will convene at the Greenbrier Hotel, White Sulphur Springs, W. Va., for its 28th annual convention. Distinguished representatives of agriculture, industry and government are scheduled to be on hand for the three-day meeting which ends June 17. According to the NFA, advance registration indicates that the number present will surpass previous records.

The Association's Plant Food Research Committee will present a panel discussion at an open meeting on the morning of June 15. Participants will be W. B. Camp of W. B. Camp & Sons, Inc., Bakersfield, Cali-

Photo (left):
W. B. CAMP
To Appear on Opening Program

Photo (right):
JAMES FERGUSON
Discusses Sprinkler Irrigation

H. H. TUCKER
Heads Plant Food Research Committee

LOUIS WARE
NFA Board Chairman Makes Report

W. F. PRICE
Represents Fertilizer Industry

fornia; R. Q. Parks, Division of Soil Management and Irrigation, BPISAE, U. S. Department of Agriculture, Beltsville, Md.; James Ferguson, Memphis, Tennessee, who will speak for the Sprinkler Irrigation Association, Washington, D. C.; and H. H. Tucker, director, Coke Oven Ammonia Research Bureau, Columbus, Ohio, and chairman of the committee, who will preside. The topic: "Efficient Water Utilization".

A meeting of the NFA board of directors will be held also.

Hugh M. Comer, president, Avondale Mills, Sylacauga, Ala.; Hon. True D. Morse, Under-Secretary of Agriculture, Washington, D. C.; and Louis Ware, president, International Minerals & Chemical Corp., Chicago, are to appear on the program during the morning of June 16. Mr. Ware will speak as chairman of the board of directors.

Leading off at the second general session, June 17, will be Russell Coleman, NFA's president, followed by a panel discussing "Proper Use of More Fertilizer." With Roy Battles, assistant to the master, The National Grange, as moderator, the following will take part: Milton C. Cummings, president, Farmers and Merchants Bank, Effingham, Kansas, representing the credit agencies; Werner L. Nelson, in charge, Soil Fertility Research, School of Agriculture, North Carolina State College, representing the Land Grant Colleges; Frank W. Parker, Director of Soils Research, BPISAE, U. S. Department of Agriculture; and W. F. Price, Plant Food Division, Swift & Company, Chicago, Illinois, speaking for the fertilizer industry.

Recreational and social events are being planned for the conventioneers. These will include golf, tennis, riding, horseshoe pitching, shuffle board and swimming. The annual banquet will be held on June 16 in connection with "Festival Night." Sporting and social activities for the ladies are included on the agenda.

Photo (left):
HUGH M. COMER
Scheduled for Tuesday's Session

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Photo (right):
ROY BATTLES
Will Moderate Wednesday's Panel

How Various Formulations Affect the Performance of

Dithiocarbamate Fungicides

VARIOUS derivatives of dithiocarbamic acid, such as ferbam (as "Fermate"), zineb (as "Dithane Z-78"), and ziram (as "Zerlate"), have now been in use as foliar fungicides for a period of 10 years or more. "Manzate," which has not yet been given a common name, is the most recent introduction in this group of organic materials. Three of these, namely,—ziram, ferbam, and "Manzate," are at present manufactured and sold almost exclusively as wettable powders. An early exception to this type of formulation was nabam ("Dithane D-14"), which was developed originally as a liquid.

It was soon found, however, that the reaction product obtained when zinc sulfate is added to nabam to form what is essentially zineb, is a much more effective fungicide than nabam used alone. This has resulted, in this instance, in the manufacture and use of both the liquid nabam ("Dithane D-14," liquid "Parzate," and other trade names), and the wettable powder formulation known as zineb ("Dithane Z-78," "Parzate," and others). The nabam plus an aqueous solution of zinc sulfate, is used as a tank-mix formulation prepared in the field just before its application, whereas zineb as a wettable powder is prepared by the manufacturer for later use by the grower.

Field comparisons made on potato and tomato over the past 5 or 6 years have shown the tank-mix and wettable powder formulations of zinc ethylene bis dithiocarbamate to be approximately equal in their ability to control the early *(Alternaria)* and late *(Phytophthora)* blights on these crops. The tank-mix formulation of zineb has come to be used by the majority of potato growers, primarily because it is less costly than the wettable powder. If nabam plus zinc sulfate is as effective as zineb as a wettable powder, then it is possible that nabam plus manganese sulfate would be equal to "Manzate," and that sodium dimethyl dithiocarbamate (no common name as yet) plus zinc sulfate would give as good control of tomato anthracnose and various other vegetable diseases as ziram. The same statement might also be made relative to ferbam, as well as the "Zac" and "Vancide" complexes. It is with these possibilities that this discussion is concerned.

Trade names of fungicides to which Dr. Wilson refers in his article, with their manufacturers, are as follows:

"Zerlate"
"Parzate"
"Manzate"
E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

"Dithane Z-78"
"Dithane D-14"
Rohm & Haas Co., Philadelphia, Pa.

"Methasan"
Monsanto Chemical Co., St. Louis, Mo.

"Zac"
"SDDC"
B. F. Goodrich Chemical Co., Cleveland, Ohio

"Vancide 51"
R. T. Vanderbilt Co., New York

Many Names Involved

FERBAM in the form of a wettable powder, commonly known in the trade as "Fermate," was the first of the dithiocarbamates to come into general use as a fungicide for use on vegetables. This was soon followed by nabam, now designated as "Dithane D-14" and other trade names. The reaction product of nabam plus zinc sulfate was introduced next, and this was soon followed by zineb.

Zineb was first known as "Dithane Z-78" and "Parzate." In the meantime, ziram, in the form of wettable powders known as "Zerlate" and "Methasan," came into use on vegetables, particularly for the control of tomato anthracnose. "Manzate," as a wettable powder formulation in which the zinc of zineb is replaced by manganese, has been the most recent addition to this group of organic fungicides. Two modified dithiocarbamate formulations, under the trade names of "Zac" and "Vancide 51," have been tested experimentally during the past few years.

Nabam, as "Dithane D-14" and liquid "Parzate," was the only member of this group of fungicides to be tested extensively and used in the liquid form until about three years ago. "Methasan" (ziram) and "Zac" were tested as slurries previous to 1950. In 1951 and 1952, several of the dithiocarbamate fungicides were prepared as tank-mix formulations and compared with their corresponding wettable powders for the control of vegetable diseases, chiefly

by

Dr. J. D. Wilson

Dept. of Botany and Plant Pathology
Ohio Agricultural Experiment Station
Wooster, Ohio

early and late blights of tomato and potato. Late blight proved to be scarce in 1951 and virtually absent in 1952 in Ohio. Thus, most of the data obtained during the last two years have had to do with the control of early blight on potato and tomato, and this disease varied considerably in its severity, depending on the season and the geographical location.

Although ferbam was the first of the dithiocarbamates to be tested on vegetables, it was soon found that ziram was a better fungicide for use on this group of crops, especially for the control of the various anthracnose diseases of vegetables. Ziram was first used as a wettable powder but comparative tests later demonstrated that "Methasan" slurry, in which the original precipitate was not dried following its preparation by the manufacturer, was considerably more effective as a fungicide than the wettable powders known under the trade names of "Zerlate" and "Methasan." This is shown in Table 1 where the averages of the results obtained in 11 experiments on tomatoes are given for these two formulations of ziram. The much better control of late blight given by the slurry in the five experiments where this disease occurred is worthy of note.

In another group of 11 experiments on potatoes, the data for which are not given here, the slurry-treated plots gave an average yield increase of 12 bushels per acre over those sprayed with ziram as a wettable powder. The corresponding percentages of defoliation were 32 and 38 percent, respectively.

Nabam (as "Dithane D-14") plus an aqueous solution of zinc sulfate, and zineb (as "Dithane Z-78"), have been compared on potatoes and tomatoes for several years in Ohio. The average results obtained in seven experiments conducted on tomatoes during the 4-year period from 1948 to 1951 showed that the wettable powder gave only a slight yield increase (0.3 tons per acre) over that furnished by the tank-mix formulation. There were also a few less culls and slightly less defoliation on the

TABLE 1

Comparative effectiveness in disease control on tomatoes of wettable powder and slurry formulations of Methasan (ziram). Data are averages of 11 experiments conducted over a period of 4 years.

Methasan (ziram) formulations	Net yield in Tons/Acre	Percent culls	% of fruits showing anthracnose lesions	% of defoliation	% of fruits showing late blight lesions in 5 experiments
No treatment	14.2	26.1	5.7	70	38.7
Wettable powder	17.1	17.1	2.4	45	19.6
Slurry	18.1	13.2	1.7	32	10.4

TABLE 2

Comparative control of tomato diseases by variously formulated dithiocarbamates in two different experiments at Wooster in 1950. Late blight was severe, early blight medium, and anthracnose light.

Formulations	Net yield in Tons/Acre	% culls	% anthracnose	% of fruits showing late blight	% of defoliation
Experiment I					
No treatment	5.0	73.5	2.5	87.5	84
Ziram, wettable	14.4	47.7	0.6	45.4	52
Ziram, slurry	19.4	25.6	0.0	15.9	32
Zineb, wettable	22.0	18.6	0.3	11.7	29
Nabam + $ZnSO_4$	21.8	17.0	0.3	9.0	34
Experiment II					
No treatment	10.4	33.1	3.0	35.4	71
Ziram, wettable	13.5	27.8	0.2	29.2	54
Ziram, slurry	15.8	12.1	0.1	9.0	30
Zineb, wettable	16.0	9.3	1.2	6.0	35
Nabam + $ZnSO_4$	17.0	7.4	0.6	2.9	37

TABLE 3

Comparative effectiveness of three dithiocarbamate fungicides in wettable powder and tank-mix formulations in the control of early blight on potatoes and tomatoes. Data are average of results obtained in 1951 and 1952.

Formulations	Potatoes Average of 7 expts. Yield in Bu/Ac	Potatoes Average of 7 expts. % defoliation	Tomatoes — Avg. of 3 expts. Yield in T/A	% culls	% defoliation	% of total yield harvested green in 1952
No treatment	358	74	15.1	6.6	78	10.5
Ziram	445	37	18.1	5.8	57	15.7
SDDC + $ZnSO_4$	456	28	20.7	5.1	44	18.8
Zineb	458	31	19.4	4.9	37	25.8
Nabam + $ZnSO_4$	451	29	18.7	5.2	35	23.4
Manzate	451	33	19.0	5.4	37	28.3
Nabam + $MnSO_4$	449	39	18.9	5.7	53	24.7

zineb plots. On the other hand, nabam plus $ZnSO_4$ gave somewhat better control of anthracnose *(Collectotrichum)* and late blight on the tomato fruits than did zineb.

Late blight infection was severe in most of the experimental tomato plots at Wooster in 1950. As a result of this, it was possible to obtain a good comparison of the ability of various fungicides to control the disease under field conditions. Some of the data relative to two of these experiments are given in Table 2. The severity of late blight in Experiment I is indicated by the fact that 87.5 percent of the fruits in the untreated check plots became infected.

The comparative effectiveness of ziram as a wettable powder and as a slurry is well illustrated in the data relative to this experiment. The powder reduced the number of infected fruits by nearly 50 percent, whereas the slurry formulation reduced the disease by more than 80 percent. A light infection of anthracnose was reduced by 75 percent by the wettable powder and was completely controlled by the slurry. Defoliation, reduced from 84 percent in the untreated check plots to 52 percent by ziram as a powder, was still further reduced to 32 percent by the slurry; and the check yield of 6 tons per acre of usable tomatoes was increased to 19.4 tons by the slurry, whereas the yield on the plots treated with the wettable powder was considerably less at 14.4 tons. Zineb and the nabam plus $ZnSO_4$ formulations gave very similar results in this experiment. Both gave somewhat better control of late blight on the foliage and fruit than did ziram as a slurry.

Ziram Slurry Effective

IN Experiment II of Table 2, where 35 percent of the fruits in the untreated check plots were infected by late blight, the slurry formulation of ziram was much more effective in controlling the disease than was the wettable powder. This was also true of foliar infection, as is shown by a comparison of the relative percentages of defoliation on the differently treated plots. The tank-mix formulation of zineb (nabam plus $ZnSO_4$) was somewhat more effective in checking late blight and anthracnose on the tomato fruits in this experiment than was the wettable powder.

Zineb, as a wettable powder and a tank-mix formulation (nabam plus $ZnSO_4$), has been compared in 15 different experiments on potatoes over a period of 5 years in three different locations in Ohio. The average yields for the untreated checks, zineb as a powder, and the spray-tank mixture of nabam and $ZnSO_4$, have been 372, 509, and 511 bushels per acre, respectively. The corresponding percentages of defoliation, due mostly to early blight but partially in some instances to late blight, have been 78, 31, and 30, respectively. This is fairly conclusive evidence that there is comparatively little difference in the fungicidal efficiency of the tank-mix and wettable powder formulations of both Dithane and Parzate.

The performance record of ziram as a slurry made it seem desirable to compare a tank-mix formulation of liquid sodium dimethyl dithiocarbamate (SDDC) plus zinc sulfate with ziram in the form of a wettable powder. This was done in 1951 and 1952 when tank-mix formulations of several of the dithiocarbamates were compared with their corresponding wettable powders for the control of the early and late blights of potato and tomato. Some of the data relative to these experiments are given in Table 3.

These data show that a tank-mix ziram (SDDC plus $ZnSO_4$) gave an average yield increase of 11 bushels per acre over the wettable powder, and also gave considerably better control of defoliation, most of which was due to early blight. Zineb and the tank-mix formulation of nabam plus $ZnSO_4$ again gave very similar results. "When "Manzate" was compared with nabam plus $MnSO_4$, the latter gave somewhat poorer control of defoliation than "Manzate," but the yields from the two formulations were very similar.

Differences in favor of the tank-mix formulation of SDDC plus $ZnSO_4$ over ziram as a wettable powder were even greater on tomatoes. The former gave a yield increase over the latter of 2.6 tons per acre; permitted 0.7 percent fewer culls; and decreased the defoliation of the check by 44 percent, whereas it was reduced by only 27 percent by the powder. In 1952, when early blight infection occurred rather late in the season, there were many more green fruits left on the vines treated with the tank-mix ziram than on those treated with the wettable powder. This is worthy of note, since the quantity of green fruit left on the plants after harvest is an excellent criterion of foliage and plant condition.

Differences in the various criteria listed as an aid in judging fungicide performance in Table 3 were again quite minor for zineb as a wettable powder and a tank-mix formulation. The spray-tank mixture of nabam plus $MnSO_4$ again gave comparatively poor control of defoliation, although the resulting yield was not very different from that of the plants treated with "Manzate" which was responsible for a considerably larger yield of green fruits at the end of the season than was the tank-mix formulation.

In other comparisons between different formulations of the dithiocarbamates, ziram as a slurry and as a tank-mix formulation both gave better control of early blight on tomatoes than did the wettable powder. The same statement can be made with reference to "Zac", where the tank-mix formulation of sodium dimethyl dithiocarbamate-cyclohexylamine plus $ZnSO_4$ gave better control than did the slurry, which in turn was considerably more effective than the wettable powder in the control of early blight on tomato. "Vancide 51" plus $ZnSO_4$ was definitely superior to a wettable powder formulation of the same material in controlling the same disease.

In 1952 a tank-mix formulation of "Zac" was much superior to the wettable powder in the control of tomato early blight, and this was also true with respect to "Vancide

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As Russian Potash Enters U. S. Market:

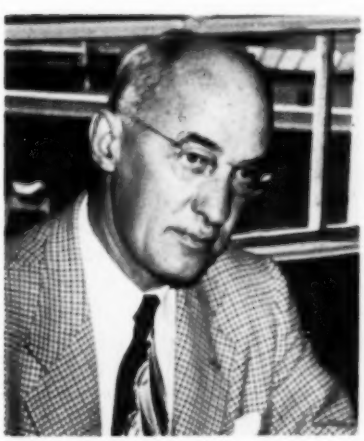
To Buy or Not to Buy----

...That is the question facing fertilizer trade, Congressional Sub Committee is told in Washington. Reds out to disrupt U. S. prices and distribution.

DISRUPTION of the American market for potash as the result of dumping of supplies of Russian origin at prices below American cost of production was charged by witnesses testifying on April 20th, before the Sub-committee on Fertilizer and Farm Machinery of the House Agriculture Committee. Russian-produced potash has been coming into the United States in considerable and increasing quantities, it was charged, and the committee was asked to investigate the situation thoroughly to determine the full extent of the reported "dumping" and its probable effect on American agriculture and the American potash industry.

Principal witness before the sub-committee was George E. Petitt, vice-president in charge of sales of Potash Company of America, who also presented the views and testimony of four other New Mexico potash producers, United States Potash Co., Southwest Potash Co., Duval Sulphur and Potash Co. and International Minerals & Chemical Corp. Potash of Russian origin has been shipped into the United States since 1950, Mr. Petitt reported, the first opportunity for its sale here having been created by the strike against all the New Mexico potash mines that year. Imports in 1950 were 65,000 tons of K_2O. They advanced to 98,000 tons in 1951 and dropped off to 55,000 tons in 1952, reflecting increased domestic production.

The situation has currently become more acute because of very low quotations currently being offered, in some cases below American costs, on potash of Russion or Russian satellite origin. Shippers in East Germany are currently reported to be making desperate efforts to sign contracts now for deliveries during the coming crop year beginning June 1. A recent sale of a cargo has been reported at a price of $29.70 per ton (60% basis). This is in sharp contrast to prices quoted during 1950, when, with American users unable to buy domestic potash because of the Carlsbad strike, Russian sellers de-



Speak up for Domestic Supplies

GEORGE E. PETITT

Potash Company of America, charges Reds' low price is simply a means of gaining their own desired end of damaging U. S. Agricultural economy.

ALFRED J. DICKINSON

Virginia-Carolina Chemical Corp., urges purchases from western Europe if potash imports become necessary. Red boycott regarded as urgent.

manded and received as high as $51 a ton.

Mr. Petitt emphasized that the American potash industry is not seeking protection on the basis that it is "too delicate to stand on its own feet, or too fragile to stand up against legitimate foreign competition." He reminded committee members however, that "American potash producers are free enterprise companies. We must make our earnings cover our costs, and yield a profit as well. And we must pay taxes.

"The Communist potash monopoly, on the other hand, can ignore all these considerations. They need not cover costs; they need not make a profit; they need not pay taxes. . . . If it suits the Communist party line to sell potash in the United States in quantities and at prices designed to ruin this vital industry here, that is the only factor the Communist potash monopoly must consider."

"It cannot be argued, he added that the American farmer will profit by the cut rate sales of potash, such as the Russians are now apparently offering. The disorganized American market that would result from any substantial invasion of cut rate Communist potash might indeed yield the American farmer a temporary advantage of a lower price for fertilizer. But as soon as the United States potash producers were crippled, the American consumer, as he was before in the period of shortages, would be compelled to pay such prices as the Communist monopoly might dictate. The Communists could affect our entire agricultural program by whipsawing and disrupting the potash market as they chose."

"By far the great majority of American farmers, Mr. Petitt told the committee, are strongly opposed to buying from Russia. This is true also of the great majority of fertilizer manufacturers. However, if a few manufacturers take advantage of the very low prices for which this Communist product can be bought, the others can be put in a competitive cost squeeze which could be economically disastrous. With competition keen in the industry, the use of Russian potash inevitably would spread. This would mean that American production would drop off, some mines might have to close down and a new emergency could find us again without sufficient supplies or productive capacity for a material vital to our country's agriculture."

Red's Potash Not Needed

ADDITIONAL testimony was presented to the committee by a long series of witnesses, including several other representatives of the fertilizer industry, representatives of farm co-ops, potash importers, etc. Alfred J. Dickinson vice-president of the Virginia-Carolina Chemical Corp., Richmond, Va., indicated that his company's policy is not to buy fertilizer materials originating in Russia, or in Russian satellite countries. During the past year, he reported, they have from time to time been offered muriate of potash and sulphate of potash originating from Russian controlled sources at prices considerably lower than current domestic U. S. prices. They have refrained from buying such material.

"It is our belief", Mr. Dickinson stated, "that if we need additional supplies of potash over and above that which we are able to procure from domestic producers, it is desirable for us to purchase such additional supplies from Western European sources instead of from Russia and Russian satellites. . . . Each ton of potash bought from Russian controlled areas means that much less that could be purchased from Western European countries. Those countries would then, therefore, be deprived of the opportunity of acquiring proportionately more of the dollars they need through trade — not aid."

Clarence B. Robertson, president of Robertson Chemical Corp., Norfolk, Va., echoed this same sentiment. He said in part, "there will be ample domestic potash for agricultural and chemical purposes next year produced in our own country. In addition, there is a very sizeable amount that can be imported from France, Western Germany and Spain without going behind the Iron Curtain. . . . I heartily approve of buying from our allies, for we certainly cannot sell them if we do not purchase what they have to offer, but I do not believe in trading with the enemy. . . . I do not wish you to think, however, that I am other than an average selfish business man. If this potash is allowed to come in from behind the Iron Curtain at reduced prices, competition will force us to buy. We do not want to do it."

Omar Sanders, vice-president of Fertilizer Industries, Inc., New York, which handles purchases of fertilizer materials for a group of twenty-one fertilizer factories, testified that his group, too, as a matter of principle, has consistently refrained as far as possible from purchasing potash or other materials originating in East Germany, Russia, or other of the Russian satellite countries. Many other buyers of potash, for similar patriotic reasons have likewise refrained from buying potash of Russian origin. However, he pointed out, "there are others with whom our group is in competition who have purchased supplies of potash, which according to reports, have originated behind the iron curtain, at lower prices than we have paid for our supplies, which, of course, gives them an advantage competitive-wise."

J. C. Crissey, division manager of the Fertilizer and Chemical Division of the Cooperative Grange League Federation Exchange, (G.L.F.) Ithaca, N. Y., reported that his organization purchases most of its potash requirements from domestic producers. They do purchase a few thousand tons of French potash at Atlantic Ports, he indicated, at a premium over the domestic price. This small quantity of western European potash is purchased as insurance against possible mechanical breakdown or a strike in the plants of one or more of their domestic suppliers.

"We could save our members some money on fertilizer through the purchase of East German potash, he continued." However, we know the hundreds of farmer members of the G.L.F. who have sons or may have sons in Korea and other areas fighting the Communists, would definitely

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Technical BRIEFS

Control of Cotton Soil Pests

Control of root-knot nematode in cotton in Kern County, California, has proved to be profitable, according to tests made in that area. A number of results were noted in experiments in 1950, 51 and 52. One notation is that because young nematodes do not travel long distances in the soil, cotton production can be satisfactory if planted in a fumigated area despite heavy nematode populations in adjacent soil. Also, the amount of soil fumigant needed for row treatment can be reduced by two-thirds of the amount required for flat treatment (in plantings where rows are spaced about 38" apart).

Test plots were set up on a field known to be heavily infested with root-knot nematode and standard flat treatments of 20 gallons of "D-D" were applied in rows two weeks before planting and also at the time of planting. The row applications were made more than a foot deep to minimize loss of fumigant from the sides of the bed.

Stand counts were made after treatments to see whether the plants were affected by the application, but counts were variable and showed no correlation to treatments.

After harvest, the date showed that the increased value of the crop from each treatment was sufficient in every case, to return an amount greatly in excess of the expenditure for fumigation. Although the flat treatment involves a considerably higher cost, it is an excellent method of controlling root-knot nematode and these tests gave by far the greatest increase in yield of any of the treatments.

After the final picking, plant roots were examined to determine the degree of root-knot nematode infection at the end of the growing season. The roots of 100 cotton plants from each replicate were examined. These roots were placed in five classes from 0 to 4 according to the degree of infection found. Plants classed as 0 were free of root-knot nematode galls, those in class one had 1%-25% of the roots with galls, class two had 26%-50% of the roots with galls, class three had 51%-75% and class four had 76%-100%. To arrive at the root index each class was weighted by the factor of 0, 1, 3, 5, 7 for the classes 0 to 4 respectively, then the total divided by seven.

The results of these tests show that the flat treatment was much more effective than any of the row treatment in reducing the root-knot nematode population. Also it is apparent from the root gall examinations that it is not necessary to kill all of the root-knot nematodes in the area to obtain satisfactory growth of plants in fumigated soil.

One difficulty encountered in the row treatments resulted from the undecomposed roots and plants parts which caught on the chisels and disturbed the beds excessively, loosening the soil where the seeds were planted. This could possibly dry out the soil too rapidly and have an adverse effect on germination. In some cases the loose soil resulted in seeds being planted too deep.

Excessive disturbance of the soil probably can be avoided by fumigating at the same time the beds are formed. This would offer the additional safety factor of treatment well before planting time. Further investigations concerning the possibility of phytotoxicity—plant injury—in different soil types and under varying weather conditions are being continued. Fumigation at the time of planting can not be recommended for general use until more information on phytotoxicity is obtained.

—D. J. Raski, M. W. Allen and V. E. Burton, University of California, in *California Agriculture*, April, 1953.

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Steam Used in Fumigation

Steam injection of chloropicrin in storage houses for fumigation of potatoes has proved satisfactory from the standpoints of both economy and efficiency, according to a report by Norman D. Dobie, Roy A. Young, and J. A. Milbrath, Oregon Agricultural Experiment Station, in *Phytopathology* for December, 1952

Usual method of introducing chloropicrin into storage areas is by saturating sacks with the gas and allowing them to disperse the fumigant. This method costs approximately a dollar per 1000 cubic feet of space, which was considered prohibitive in the case of large areas of more than 100,000 cubic feet.

Experiments by which chloropicrin was introduced to such areas by thermo-aerosol fumigation showed that the presence of steam raised the temperature and humidity in the storage space and aided in dispersion and volatilization of the fumigant.

In the tests described, a flash type steam generator was used, but the authors indicate that any other source of steam should be as satisfactory. A high-pressure steam hose carried the steam into the building, and a venturi nozzle at the end of the hose increased the velocity of the steam and facilitated pickup and vaporization of the chloropicrin. Steam was forced into the building to raise the temperature, (70°F. and a humidity approaching the saturation point is necessary for this type of fumigation) then the actual fumigation was initiated by attaching the venturi lead-in tube to a rubber hose con-

nected to a siphon apparatus in a gallon jug containing the toxicant.

The passage of steam through the venturi created a vacuum which drew the chloropicrin into the steam being discharged into the storage house. The rate of flow of the material into the venturi was regulated by clamp or valve connections at a point between the steam hose and the vessel containing the fumigant.

In order to test the effectiveness, the experimenters placed *Fusarium roseum* (Link) Snyder & Hansen in strategic spots within the building and returned to the laboratory for testing after 24 hours of exposure to the fumigant.

In large potato warehouses, efficient kill was obtained consistently with concentrations of 68 ml. or ¼ pound of chloropicrin per 1000 cu. ft. The approximate cost of chloropicrin use at this rate would be 25¢ per thousand cubic feet. Effective disinfestation was obtained in five out of seven houses fumigated with concentrations of 34 ml., or ⅛ pound per thousand cubic feet.

Use of a thermo-aerosol method of appplication gives optimum conditions of both temperature and relative humidity for effective use of chloropicrin, the authors concluded. Moreover, the fumigation is less hazardous since the operator remains outside the building during the process and yet the material is dispersed throughout the area. The complete fumigation operation can be effected in less time than is possible with other methods and requires approximately ¼ to ⅛ as much fumigant for effective kill of a test organism as that recommended for use with other methods of application.

•

TDE For Tomato Pest Control

Investigations conducted with dieldrin, aldrin, heptachlor and Q137 have shown that none of these insecticides are as effective as TDE against caterpillars attacking tomato. Dieldrin, aldrin and heptachlor all showed promise in controlling the agromyzid leaf miner, *Liriomyza subpusilla* (Frost). Dieldrin, however, appeared to be somewhat more effective than the other two. Because dieldrin, aldrin and heptachlor are not as effective as TDE in controlling caterpillars, their use in the tomato insect control program should probably be limited to those cases where the leaf miner threatens to become a problem. Timely applications of any of these materials should result in effective control of the pest, and based upon results obtained in the present experiment as well as others it appears that a single treatment should remain effective for a period of at least 3 weeks.

A. E. Michelbacher, O. G. Bacon, W. W. Middlekauff and W. Erwin, University of California, Berkeley: "Tomato Insect Investigation in Northern California in 1951"; in *J. Economic Entomology*, Vol. 46, No. 1, February, 1953.

•

Fungicide Program Described

In discussing the problems involved in a spray program on tomatoes, W. T. Schroeder, New York Agricultural Experiment Station, Geneva, points out in the Station's bulletin, *Farm Research* that whether it pays off to protect crops from diseases such as late blight, depends upon a number of factors which he enumerates.

First, he says, fungicides are not "cure-alls". It is a mistake to assume that application of fungicides will take care of all diseases and that other rules of crop protection may be ignored. Fungicides at best, seldom give absolute control of disease. This is especially true of anthracnose, he says.

There are also a number of diseases which cannot be controlled by fungicides. These include tobacco, mosaic, cucumber mosaic, spotted wilt, blossom-end rot, bacterial canker, brown wall and Verticillium wilt. On the other hand, diseases commonly controlled by fungicides are early blight, late blight, anthracnose, Septoria blight, leaf mold and gray leaf spot. Of these, the first three are a constant threat to the tomato crop. The others are sporadic in occurrence and a fungicide program designed for the first three usually controls them.

Dr. Schroeder warns that the earlier a disease appears and the more severe it becomes, the harder it is for the fungicide to control it. The amount and severity of a disease depend upon two factors — weather and availability of the pathogen that causes the disease. Nothing can be done about the weather, but much can be accomplished by means of good cultural practices to reduce or eliminate the source of the pathogen and thus delay its intensity.

The use of transplants which have been kept free of diseases in the seed-bed insures a good healthy start to the field plants. Much of the early and subsequent severe disease development in the field can be traced to infected transplants.

Good rotations are important. Tomatoes should not be grown consecutively on the same field for it only encourages heavy development of early blight, Septoria blight, and anthracnose, not to mention Verticillium wilt which cannot be controlled by a spray program. Neither should they follow potatoes because that increases the possibility of late blight, also of Verticillium wilt.

Although many materials may be used as tomato fungicides, none has proved to be ideal in New York State, he reports. However, since 1946, a split schedule of ziram and bordeaux has given the best performance against a wide range of disease severity. It involves five applications in the order of ziram-ziram-bordeaux-ziram-bordeaux, beginning when the fruit on the first set is about the size of golfballs. Applications are then continued at ten to fourteen-day intervals.

Ziram is applied at 4 pounds per acre per application and bordeaux at 16 pounds of copper sulfate and 8 pounds of spray lime per acre. "Orthol K" at 1 quart per 100 gallons of spray mixture enhances the performance of ziram against the blights. Fixed coppers at the rate of 4 pounds of metallic copper per acre may be substituted for bordeaux, but are more expensive and generally not quite as good. Except under severe conditions of late blight, applications

(*Turn to Page* 129)

Suppliers' BULLETINS

Detergent for Fertilizer Mfgr.

Universal Detergents, Inc., Long Beach, Calif. has published a new bulletin, designated as "Bulletin No. 53," describing the use of its product "Udet F" in ammoniated mixed fertilizers. This material is synthesized specifically for use in the fertilizer industry, its makers state. It gives instantaneous solution in low moisture materials, permitting use with no change in customary operating procedures and time schedules, the bulletin says.

"Udet F" is offered in two forms to meet specific operational requirements. "Udet 90-95F" is a powder containing 90 to 95% active ingredients; and "Udet 50F" is a free-flowing liquid containing 50% active.

The bulletin presents full information on the use of the detergents, with diagrams, flow charts and written descriptions of best techniques.

Write for Bulletin 53, Universal Detergents, Inc., 1825 E. Spring St., Long Beach 6, California.

•

Lindane Booklet By Ethyl

Ethyl Corporation has issued a new booklet on lindane, written primarily for insecticide formulators. It describes the chemical and physical properties of lindane, outlines its fields of usefulness and tells of the various ways in which lindane may be formulated into a finished insecticide.

Included in the booklet is an 11-page table of suggested uses which lists the form and dosage of the insecticide for each specific application as well as instructions as to when and how it should be applied. Other sections of the booklet discuss the subjects of toxicity, analytical methods and shipping and labeling requirements.

The booklet, entitled "Ethyl Lindane," is available to the trade and to professional people from Ethyl Corporation, 100 Park Ave., New York 17.

•

Offers Pesticide Catalog

Planetary Chemical Division of Universal Match Corp., St. Louis, has issued a new bulletin presenting information on its line of insecticides weed killers, emulsifiers and fertilizers. It is available upon request from the Planetary Chemical Division, Creve Coeur, Missouri.

•

Dow "Premerge" Booklets

Two booklets on its product "Premerge" have been issued by Dow Chemical Co., Midland, Michigan. The first is a folder describing the material, its use and scope of weeds it will control in various crops.

The other, a 24-page booklet, is entitled "How to Use Premerge" and gives detailed information on use of the dinitro pre-emergence weed killer on cotton. It presents a chart showing maximum temperature history for the Mississippi Delta region for the past 31 years as a guide to use of pre-emergent herbicides. Questions are answered in connection with what the product is, how it works, what it does, how to prepare the soil, suitable methods of application, soil types and information on nozzles and spray equipment in general. Precautions for users of the material are given at the end of the booklet. It is available from Dow Chemical Co., Midland, Mich.

•

Has New Type Batching Scale

A new batching scale for measuring pour-off has been introduced by Hydroway Scales, Inc., Detroit, Mich. The new device has a reverse reading dial, making it unnecessary for the operator to subtract or compute amounts of decreased weight as liquids are poured off the top.

The makers state that the scale has wide application in the batching of medium and large quantities of loose material in the chemical field. Scales are available in 500 and 1000 pound models. Further information is available from Hydroway Scales, Inc., 20624 W. Eight Mile Rd., Detroit 19, Mich.

•

Valve Catalog is Offered

Henry Valve Company has issued a new catalog listing its complete line of anhydrous ammonia valves and steel fittings for soil fertilization and other industrial equipment. The line includes a series of newly-designed valves developed by Henry for use in agricultural fertilization where noncorrosive steel is a necessity. Write to Henry Valve Company, 3215 North Ave., Melrose Park, Ill. (Suburb of Chicago)

•

Poulsen Describes Equipment

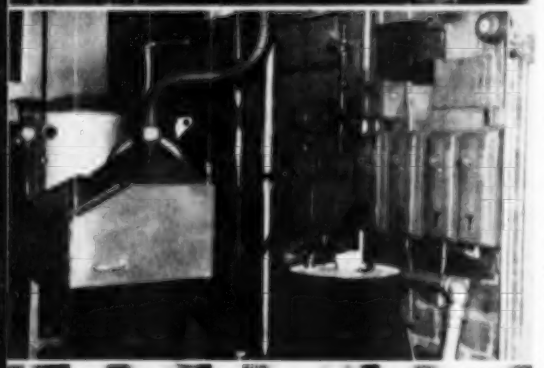
A. E. Poulsen & Co., Los Angeles, California, has prepared technical bulletins CP-310 and LF-110 describing its "Uni-Blender" compounding equipment for use in insecticide production.

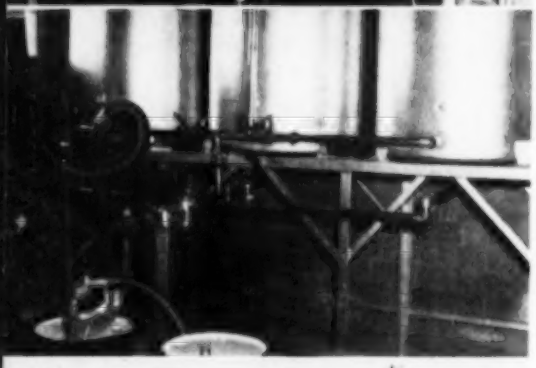
This equipment, ready to run, is available in both "standard" type and the "dual" type. The former mixes and blends dusts concentrates with diluents to produce and package field-strength pesticides. The dual type mixes, blends and packages, dry, free-flowing powdered materials; compounds finished products from ingredients requiring reduction in particle size, and compounds finished products

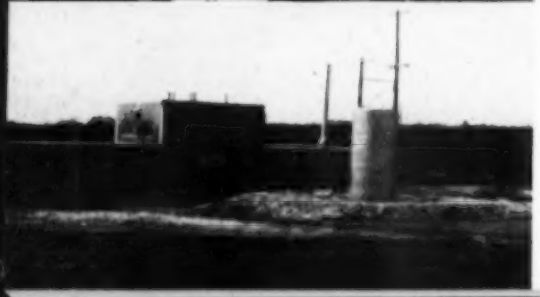
(*Turn to Page* 134)

Northeastern Chemical Corp., Westbrook, Maine, Opens

New Formulation Plant







NORTHEASTERN Chemical Corporation, Westbrook, Maine, opened its new pesticide formulation plant May first, with an open house observance to which 300 persons were invited. The new plant, featuring the latest types of machinery for grinding, mixing and blending, will produce field strength DDT (325 mesh) at the rate of 5,000 pounds per hour. According to Joseph P. McKenna, general manager of the new plant, the company expects to formulate all types of insecticides, fungicides and herbicides used in connection with New England crops. He adds that soil conditioners may be added to the line of manufactured goods at a later date. Present plans call for an operating personnel of from six to eight men, Mr. McKenna indicated.

Unusually thorough steps have been taken to assure safety in handling materials such as parathion and other chlorinated hydrocarbons. A plant-wide suction system, plus air vents, ducts and blowers, provide protection at every point where workers are exposed to either fumes or contact with various toxicants. In addition, workers are provided with plastic gloves, masks, overshoes and overalls for further protection. Work clothes are kept in a locker room at night and are never worn outside the plant. Showers are provided in the dressing room for men. Their coveralls are washed two or more times a week to prevent accumulation of toxic dusts or liquids.

Specific features of the safety equipment include hoods which fit over steel drums of parathion when they are being opened; a suction hose connecting with the wands used in

Heading cut at top of page: General view of new steel and concrete-block structure housing plant. Truck loading dock is at the left, rail loading at right.

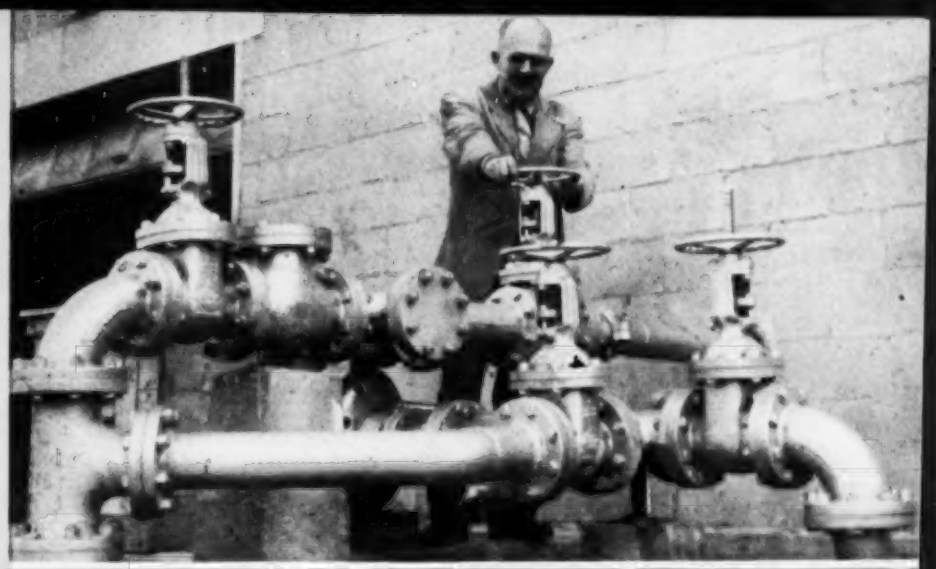
Second photo: Emptying bag of technical DDT into hopper. Adjustable hood, near workman's head, is equipped with suction to pull off fumes and dust particles. Mask gives further protection. At right is hood which fits down over drum of parathion when plugs are removed from drum.

Third photo: Hood with suction hose at top covers drum; operator works through heavy rubber flap and peers through transparent cover, wears mask and heavy coveralls as further safety assurance.

Fourth photo: suction hose draws off toxic fumes as parathion is transferred to 600-gallon holding tanks. Quick coupling arrangement provides faster and safer operation. Emptying wand remains in tank until another worker pulls it out later and catches drips in special container to prevent accumulation of toxicant on floor or on outside of tanks where contamination might result.

Lower photo: Ten-thousand-gallon solvent storage tank is situated safe distance from plant proper. Material is transferred directly from tank car on far side of building. Solvent can also be routed to holding tanks inside building when needed for immediate use. A set of valves (top of page 55) regulates the flow.

Right: Mr. McKenna adjusts valves which route flow of solvent from tank car either to 10,000-gallon storage tank 150 feet away from building, or to 600-gallon holding tank within building when material is scheduled for immediate use.



emptying drums of material; a CO_2 system throughout the plant for fire protection and a Day dust collector to control stray particles of material which otherwise would be inhaled by persons in the area.

In discussing some of the problems in connection with construction of the building, Mr. McKenna, who designed the structure and planned the general layout for machinery placement, reports that the vigorous New England climate makes necessary many features which could be ignored in other parts of the country. The building's flat roof, for instance, had to be constructed to support a possible snow load of 40 pounds per square foot; the snow sometimes reaching a depth of more than two feet in Maine.

(*Turn to Page* 131)

Second row: (left) Motor and mechanism for regulating speed of "Whizzer" which determines particle size of product being formulated. (Right): General view of Raymond Imp. mill and St. Regis bagger (at right). Mill control panel is at lower left.

Third row: (Left) Raymond Mill experts discuss installation with general manager. (L. to R.): J. L. Pardo, Raymond Div.; Mr. McKenna; and Henry Clarence, Raymond Div., New York. Right: Exhaust valve extends through roof. A "Y" valve can turn flow of air into room or direct it outside.

Lower row (L) Worm mechanism for returning useable fines from Day dust collector to surge bin above bagger. (R): One of two shower stalls and wash basin for complete cleansing of men before they change into street clothes after working with toxic materials.

WASHINGTON *Report*

HEARINGS on the "Miller Pesticide Bill", H.R. 4277, are expected to be launched by the Interstate and Foreign Commerce Committee early in June. If this tentative schedule is followed, it means that the measure faces a growing legislative log jam as Congress battles over other bills labeled "musts" by the White House.

Assuming the "Miller Bill" does pass the House, it would then be caught in the complexities of the Senate where a similar measure, S 1542, has already been introduced by Senator George Aiken, (Rep., Vermont) Chairman of the Agriculture and Forestry Committee. The Bill is in the hands of the Committee on Labor and Public Welfare. Strong backing would be required to push it through. Since Congress is already far behind schedule with important money bills still undecided, there is some support for placing the measure on the Senate consent calendar. This action would make it probable that the Bill would become law this year.

There is general support for the Bill among farm organizations and commodity groups. The powerful American Farm Bureau Federation and the National Grange are backing the broad objectives of the Bill and will document their positions before the Committee.

* * * * *

The Farm Bureau will stress five points which in essence are:

1. Permit filing of a petition with the Federal Security Agency proposing issuance of a tolerance or an exemption.

2. Require the Administrator to make public within a reasonable length of time such a regulation.

3. Provide for the Administrator or person filing request opportunity to refer matter to an advisory committee for study to be followed by publishing of a regulation by the Administrator.

4. Allow recourse to the courts in case of appeal from any final regulation thus established.

5. Provide for the establishment of a temporary tolerance on products on which an experimental permit is issued.

* * * * *

Among the commodity groups which are expected to present testimony before the Committee are spokesmen for the apple producers, potato growers. These and other agricultural interests will present general data showing the probable effects of this legislation on agricultural progress in the broad sense plus detailed information in their particular fields.

Testimony of these agricultural groups will undoubtedly have a marked influence on House reaction to the Bill. Progress will be closely watched by members of the Agricultural Committees of both Houses. Several members have a very close interest in the measure.

Final position of the Food and Drug Administration is reported yet to be determined. There is some feeling in Congress that Food and Drug may raise objections to certain sections it considers limitations to its authority.

* * * * *

Some entomologists are concerned about language of the Bill which defines a pesticide as "any substance or mixture of substances . . . ". The point is that the Bill would require the Administrator to establish a tolerance for "any poisonous or deleterious pesticide . . . ". Does this mean, they ask, every formulation of a given pesticidal material must be handled by Food and Drug as an individual case? If such an interpretation were made, it is conceivable that the resulting administrative problem would cause considerable delay and in the opinion of some, contribute little to the protection of public health.

Several changes are contemplated in the Bill by those putting the finishing touches on its drafting. One such change would make it more convenient for companies to file appeals. Instead of making the appeal to the District of Columbia Courts, representation would be made to the U. S. District Court where the company is located. Language will also be included to give the Administrator clear authority to, "deny a tolerance."

* * * * *

Importation of potash materials from Communist dominated countries was severely criticised by members of the House Agriculture Subcommittee on Fertilizer and Farm Machinery. They questioned whether any United States corporation should buy from the "enemy".

George E. Pettit, vice president of the Potash Company of America testified for his own and four other major New Mexico potash producers that Russian produced potash "dumped" into the United States, "is a serious threat to the entire potash industry in the United States . . . We are not seeking protection of an American industry that is uneconomic or too delicate to stand on its own feet."

In addition to the New Mexico potash producers, the following opposed trading in Russian-controlled potash: Representatives John J. Dempsey (D-N. M.) and Antonio M. Fernandez (D-N. M.); Omar Sanders, vice-president, Fertilizer Industries, New York; Charles B. Dunne, vice-president, French Potash & Import Co., New York; C. B. Robertson, president, Robertson Chemical Corporation, Norfolk, Virginia; A. J. Dickinson, Jr., vice-president, Virginia-Carolina Chemical Corp., Richmond, Virginia; W. E. Shelburne, vice-president, Armour Fertilizer Works, Atlanta; J. C. Crissey, Pres., GLF Soil Bldg. Service, Ithaca, N. Y.

J. R. Meyers, manager of fertilizer production and purchasing for Eastern States Farmer's Exchange, West Springfield, Massachusetts said he does not believe this is the time to consider restricting the supply of potash to domestic production.

(More details of Hearing on Page 49, this issue. This article continued on Page 119).

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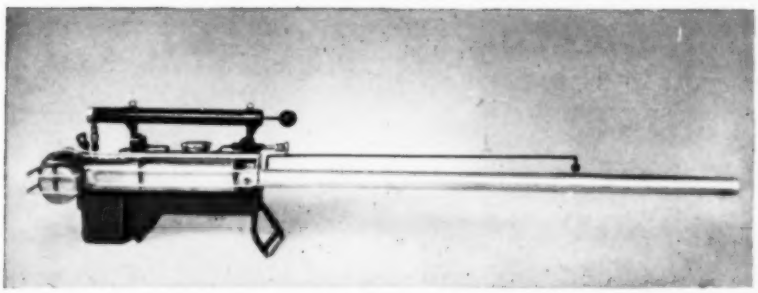

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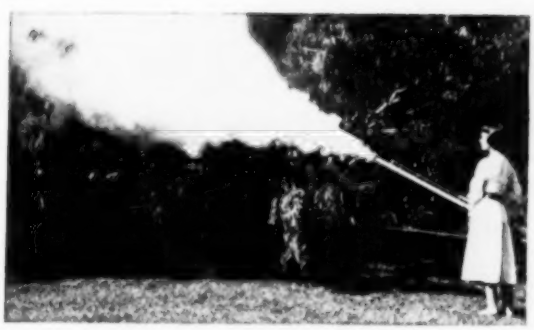

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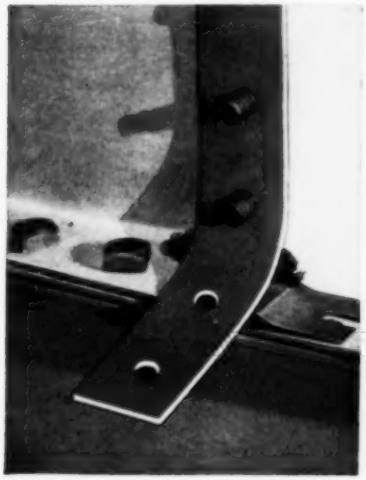

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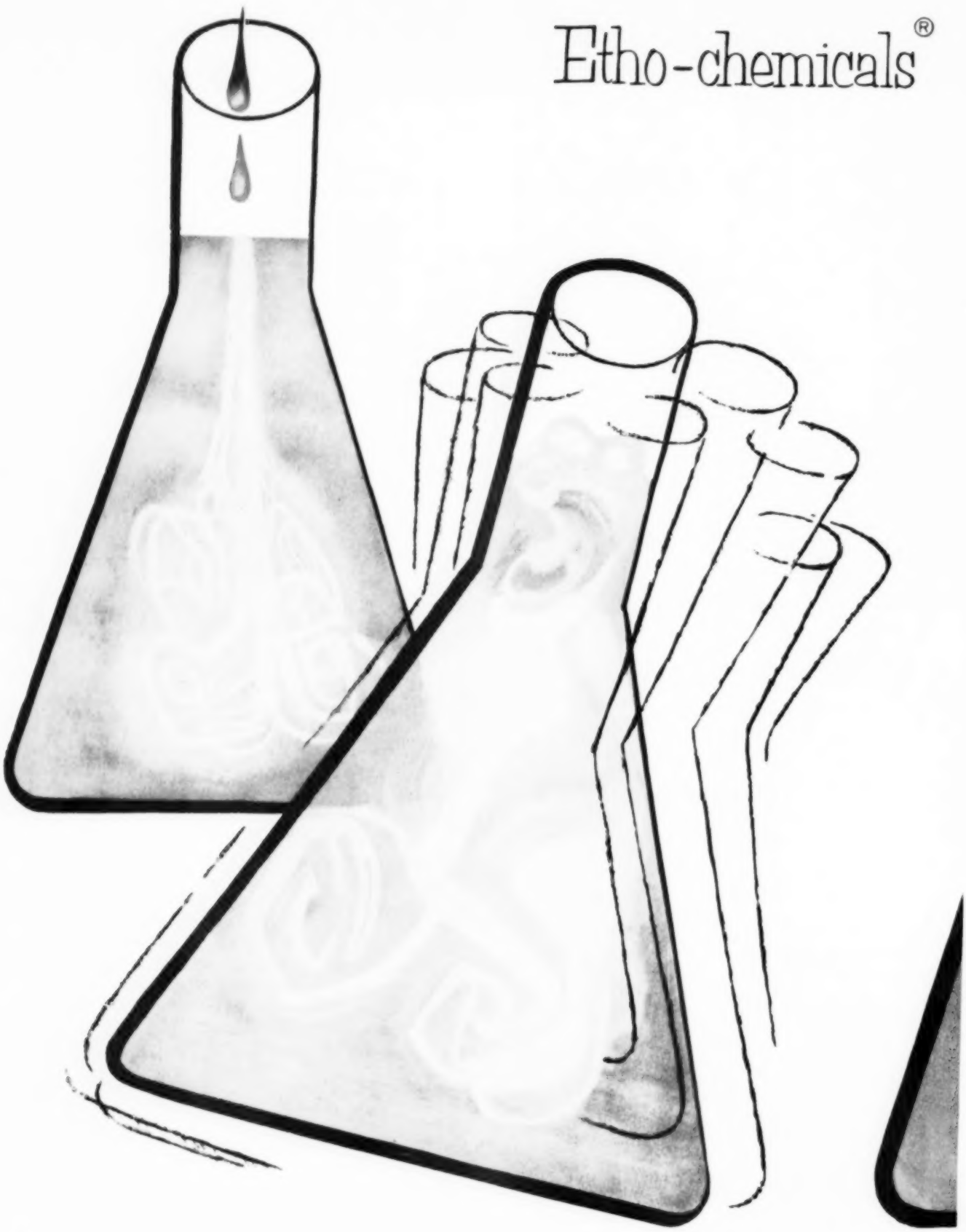

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Etho-chemicals—Armour's oil-soluble, water-dispersible emulsifiers—are especially effective in toxicant formulations. When used to form an emulsifier concentrate, such chemicals as Ethomeen S/15 make possible rapid, long-lasting emulsions with a minimum of agitation in *either hard or soft water!*

2, 4-D isopropyl ester, for example, can be emulsified easily by a combination of two mildly cationic Ethomeens—S/15 and S/12. This combination emulsifier is effective even in extremely low concentrations, providing greater economy.

Ethofat 142/20—another member of the Etho-chemical series—is an excellent non-ionic emulsifier for use with kerosene or xylol as a solvent. Ethofat 142/20 is so efficient that chlordane can be emulsified directly into water without the use of a solvent. Like the two Ethomeens, Ethofat 142/20 is not affected by water hardness.

Toxaphene, DDT, chlordane, 2, 4-D are only a few of the toxicants that can be emulsified easily and economically with these and other Armour chemicals. Write today for further information, including prices, on our complete line of emulsifiers.

ARMOUR CHEMICAL DIVISION

Armour and Company • 1355 West 31st Street • Chicago 9, Illinois

Better Insect Control

You're in the driver's seat when you use these products manufactured by the Eston Chemicals Division of American Potash & Chemical Corporation. Experienced growers know that ESTON insecticides, scientifically compounded and field-tested, provide safe and positive control of insects throughout the growing season. There is no substitute for ESTON high quality agricultural chemicals.

ALKRON®

Anti-dusting wettable powder ALKRON-W 25 and 50 HC, or emulsible solution ALKRON-25 E. Wettable powder primarily for fruit trees; emulsible for field and truck crops.

ESTONMITE®

The miticide-ovicide that attacks recurrent mites at their source—the eggs. Two formulations, ESTOMITE-50 W (wettable powder) and ESTOMITE-25 E (emulsible solution). Has long residual effect.

BROMOFUME®

Soil fumigants (ethylene dibromide solution) for control of Wireworms and Root-Knot Nematodes. Available in two formulations—Bromofume-85 and Bromofume-40. Leaves no harmful residual build-up in the soil. Easy and economical to use.

TETRON®

Non-residual organic phosphate insecticide containing tetraethyl pyrophosphate (TEPP). TETRON-100, containing 40% TEPP and TETRON-50 containing 20% TEPP. Also TETRON DX-68 for dust manufacturers.

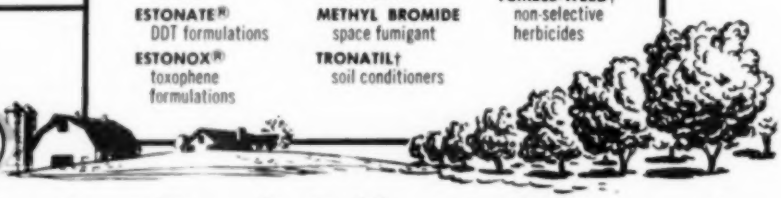
PUT THE BEST ON—USE ESTON

ARATRON† miticide containing aramite
ESTONATE® DDT formulations
ESTONOX® toxophene formulations
MALAPHOS† malathon formulations
METHYL BROMIDE space fumigant
TRONATIL† soil conditioners
TUMBLEAF® cotton defoliants
TUMBLE-WEED† non-selective herbicides

†Trade Mark A.P. & C.C.

TRONA
INDUSTRIAL AND AGRICULTURAL CHEMICALS

ESTON CHEMICALS



American Potash & Chemical Corporation

See your local Dealer or Distributor

Offices • 3030 West Sixth Street, Los Angeles 54, Calif., 122 East 42nd St., New York 17, N. Y.

Plants • Trona and Los Angeles, California

ESTON CHEMICALS DIVISION

Office • 3100 East 26th Street, Los Angeles 23, Calif.

Brush-free rangeland with

DIAMOND 2,4,5-T BRUSH KILLERS

DIAMOND 2,4,5-T is a specific for destroying pestiferous plants such as mesquite and sagebrush. This effective product of modern chemistry kills brush like nothing else can.

Wherever woody growths have become a problem, DIAMOND 2,4,5-T has proved itself as the ideal herbicide. By killing brush *effectively*, it profitably reclaims brush-filled rangeland for use as valuable cattle grazing land . . . it keeps railroad and public utilities right-of-ways clear and accessible.

DIAMOND manufactures regular and low volatile esters of 2,4,5-T in many technical forms for processors. Write for new catalog describing properties and applications.

Diamond Agricultural Chemicals

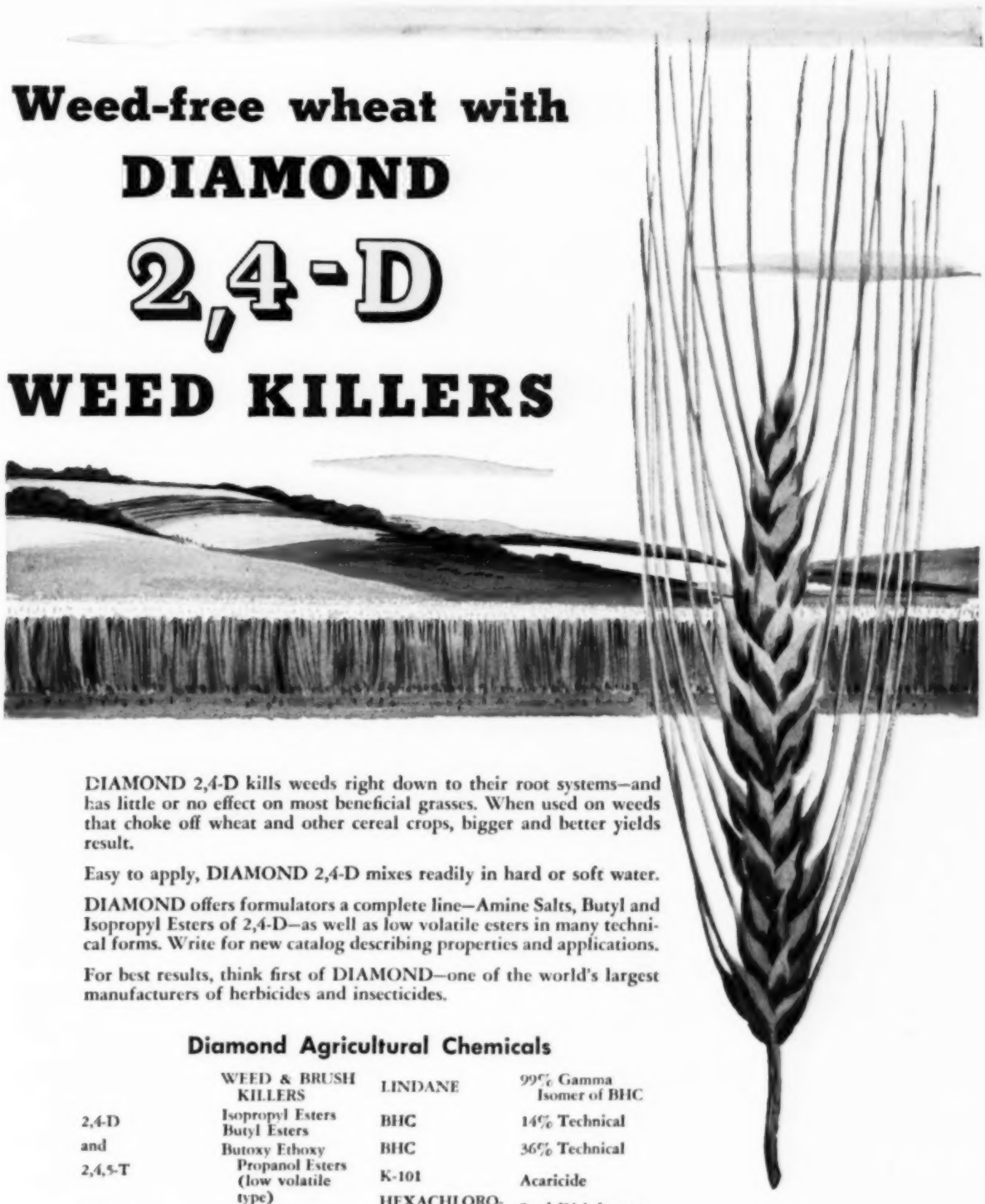
	WEED & BRUSH KILLERS	LINDANE	99% Gamma Isomer of BHC
2,4-D	Isopropyl Esters Butyl Esters	BHC	14% Technical
and	Butoxy Ethoxy Propanol Esters (low volatile type)	BHC	36% Technical
2,4,5-T		K-101	Acaricide
DDT	100% Technical	HEXACHLORO-BENZENE	Seed Disinfectant

DIAMOND ALKALI COMPANY

Organic Chemicals Division
80 Lister Avenue • Newark 5, New Jersey
Plants: Newark, N. J. and Houston, Texas

DIAMOND ALKALI CHEMICALS

Weed-free wheat with DIAMOND 2,4-D WEED KILLERS



DIAMOND 2,4-D kills weeds right down to their root systems—and has little or no effect on most beneficial grasses. When used on weeds that choke off wheat and other cereal crops, bigger and better yields result.

Easy to apply, DIAMOND 2,4-D mixes readily in hard or soft water.

DIAMOND offers formulators a complete line—Amine Salts, Butyl and Isopropyl Esters of 2,4-D—as well as low volatile esters in many technical forms. Write for new catalog describing properties and applications.

For best results, think first of DIAMOND—one of the world's largest manufacturers of herbicides and insecticides.

Diamond Agricultural Chemicals

	WEED & BRUSH KILLERS	LINDANE	99% Gamma Isomer of BHC
2,4-D	Isopropyl Esters Butyl Esters	BHC	14% Technical
and	Butoxy Ethoxy	BHC	36% Technical
2,4,5-T	Propanol Esters (low volatile type)	K-101	Acaricide
DDT	100% Technical	HEXACHLORO-BENZENE	Seed Disinfectant

DIAMOND ALKALI COMPANY

DIAMOND ALKALI CHEMICALS

Organic Chemicals Division
80 Lister Avenue • Newark 5, New Jersey
Plants: Newark, N. J. and Houston, Texas

COLUMBIA-SOUTHERN

the dependable, progressive name in agricultural chemicals.

Columbia-Southern, a leading producer of chlorine, alkalies and related chemicals for over half a century, is also a leading name in agricultural chemicals.

Noteworthy among recent developments, for example, is Columbia-Southern's work on Chloro-IPC, the herbicide ingredient that holds such great promise for the agricultural industry. Contributions in BHC, and the highly useful new carrier Hi-Sil, mark Columbia-Southern as the name you can rely on for progressive agricultural chemical development. Always specify the brand . . . COLUMBIA-SOUTHERN.

CHLORO-IPC

Isopropyl N (3-Chlorophenyl) Carbamate. For manufacturing use only. 200 lb. drums.

Used in control of certain annual grasses and broad-leaved weeds.

BHC

Benzene Hexachloride.
Supplied in technical grade only.
Gamma (above 12% to 18%, as flakes, in 300 lb. fiber drums.
Gamma (above 30% to 40%, as solid, in 100 lb. fiber drums.

Used as highly effective insecticide, especially in the growing of cotton.

HI-SIL®

A finely divided hydrated silica. 25 lb. paper bags.

Excellent for formulating 75% DDT dusts and wettable powders, and as a carrier for other agricultural chemicals.

MONO-CHLOROBENZENE

A chlorinated benzene; liquid, clear, colorless, high purity. 55 gallon drums.

Used in the manufacture of DDT and other insecticides.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

EXECUTIVE OFFICES: GATEWAY CENTER • 420 DUQUESNE WAY, PITTSBURGH 22, PA.
DISTRICT OFFICES: BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND
DALLAS • HOUSTON • MINNEAPOLIS • NEW ORLEANS • NEW YORK • PHILADELPHIA
PITTSBURGH • ST. LOUIS • SAN FRANCISCO

10-10-10 fertilizer produced up to 132.4 bushels of corn in dry growing season

Farmers interested in big corn yields from run-down land can take a tip from Andrew Cross of Letart Falls, Ohio.

In 1952, he put an excellent 10-10-10 fertilizer program into effect on his newly-purchased farm. It included 600 pounds per acre of 10-10-10 plowed down, an additional 300 pounds at planting time and 50 pounds of nitrogen as side dressing. The result, in spite of rainfall four inches under normal, was yields up to 132.4 bushels per acre on relatively good land, and 89 to 111 bushels on land that had been left idle for 30 years as unprofitable.

This spring, Mr. Cross is applying 1000 pounds of 10-10-10 at plowing time and is looking forward to even better yields than in 1952.

Bigger yields for farmers mean better business for you

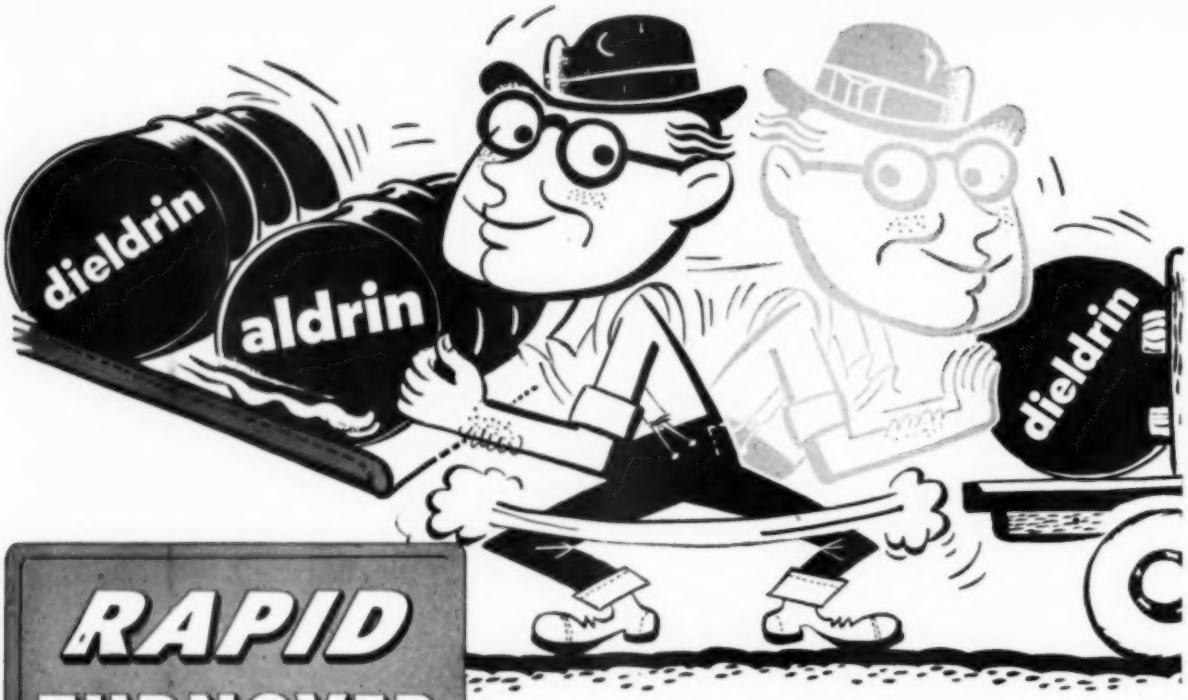
MR. CROSS embarked on his 10-10-10 program last year at the suggestion of a representative of a fertilizer manufacturer. His excellent results meant a good sale to him in 1953. You can build a profitable business in high-nitrogen fertilizers through just such an approach. It will pay off handsomely in years to come.

Be sure your high-nitrogen fertilizers are produced to give the finest performance, and that means U·S·S Ammonium Sulphate for the nitrogen content. This dry, free-running material mixes readily, won't set up in storage and behaves well in drills and other distributing equipment.

For complete information on U·S·S Ammonium Sulphate, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

U·S·S AMMONIUM SULPHATE USS

UNITED STATES STEEL



RAPID TURNOVER

Cotton growers demand more and more

...aldrin FOR FAST INSECT KILL

...dieldrin FOR LONG-LASTING ACTION

Aldrin and dieldrin, in use only a few years, have won the acclaim of growers throughout the cotton belt. In the 1952 season these insecticides proved real money makers for formulators. Powerful advertising and highly successful use have put aldrin and dieldrin in the high-turnover, high-profit class.

Aldrin with its fast-killing action and dieldrin with its long residual effectiveness are recommended for control of a wide number of agricultural and public health pests.

Shell offers complete technical service. Technical bulletins are available for detailed instructions on blending and processing, compatibility with other ingredients and the necessary safety precautions to be taken in handling these chemicals.

Send coupon for latest technical information on aldrin and dieldrin.

Aldrin-fertilizer mixture labels accepted by USDA

SHELL CHEMICAL CORPORATION
Julius Hyman & Company Division
P. O. Box 2171, Denver 1, Colorado

Please send me information on aldrin and dieldrin. I am interested in formulating insecticides for control of these pests (please list).

Name_____

Address_____

INDUSTRY News

Collinsworth to Velsicol

E. T. COLLINSWORTH, Jr.

E. T. Collinsworth, Jr. has accepted the position of vice-president of the Velsicol Corporation, Division of Arvey Corporation, Chicago. In this capacity he will act as administrative assistant for the chief operating executive of Velsicol, basic manufacturer of insecticide concentrates and petroleum resins and solvents.

Mr. Collinsworth is a chemical engineer and Harvard Business School graduate.

•

H. A. Waters, Auto Victim

Dr. Harold A. Waters, partner with Dr. C. M. Meadows in the Southwest Sprayer & Chemical Co., Waco, Texas, was killed in an automobile accident April 15, near Troy, Texas.

Dr. Waters and Dr. Meadows had established their business in January, 1950, starting out in a small warehouse. The enterprise has expanded during the past three years until its office, machinery warehouse, chemical warehouse and a modern formulating plant cover more than an acre of land.

Dr. Waters was a graduate of Ohio State University, Columbus, and did his early work with the U. S. Dept. of Agriculture. He was at one time associate professor in charge of agricultural chemical research in the experimental laboratory at Ohio State.

Joining Sherwin Williams Co., he later became head of all research and development of agricultural chemicals for S-W in the U. S. When the company discontinued this division in 1949, the Southwest Sprayer & Chemical Co. was formed by Drs. Waters and Meadows.

The two were pioneers in the low gallonage spraying industry.

> Dr. Waters was author of an article on modern spray equipment to appear in *Agricultural Chemicals* issue of June. — Ed.

Forster New Head of Hercules

Albert E. Forster has just been elected president of Hercules Powder Company and chairman of the executive committee.

He succeeds Charles A. Higgins, president and chairman of the board. Following the company's retirement policy, Mr. Higgins resigned May 1 as president of Hercules, a post he has held since 1939. He also resigned the chairmanship of the company's executive committee. He will continue as chairman of the board, a position to which he was elected in 1944.

Mr. Forster has served as vice-president and member of the executive committee since 1951. He was elected a director of the company in 1940.

Mr. Forster joined Hercules in 1925 as a technical service man in the company's San Francisco office.

ALBERT E. FORSTER

Leaving the company in 1930 for engineering practice in Brazil, Mr. Forster rejoined Hercules in 1934 as a member of the Explosives Dept.

In 1940, the new president was transferred to the Naval Stores Department as assistant manager, and a month later became general manager of that department.

Mr. Higgins has served as president and chairman of the executive committee of Hercules since 1939, and as chairman of the board since 1944.

As the chief executive of the company he has always been a strong advocate of an extensive chemical research program. Under his direction, Hercules expanded quickly in the two fields of basic raw materials it processed: Cellulose chemicals and naval stores chemicals. He was responsible for the concentration of much of Hercules research activity in the Experiment Station near Wilmington.

DDT

TECHNICAL DDT

DDT DUST CONCENTRATE

75% DDT WETTABLE POWDER

as you like it...

when you want it!

You say where and when. Michigan Chemical will be there with a fast, dependable supply of DDT, exactly as you want it.

Whether for compounding, packaging or direct application, DDT by Michigan Chemical is always of exceptionally high purity and uniformity. Write today for complete catalog of Michigan Chemical products including a wide choice of DDT concentrations and other agricultural chemicals.

michigan chemical corporation • ***Saint Louis, Michigan***

**EASTERN SALES OFFICE: 230 Park Avenue
New York 17, New York**

BASIC MANUFACTURERS OF INDUSTRIAL, PHARMACEUTICAL AND AGRICULTURAL CHEMICALS

Ohio-Ind. Applicators Meet

Some 75 custom operators attended the recent meeting of the Ohio-Indiana Conference on use of Aerial Equipment in Agriculture, held at Purdue University, Lafayette, Ind. The three-day meeting, from March 11-13, included talks and discussions of problems involved in custom operations. One talk covered the responsibilities of the airplane applicator to the public; another, by Dr. Frank Princi, on "Safe Handling of New Insecticides"; and a discourse on "How Applicators can Help Themselves," by Lowell S. Hardin.

A panel discussion of "Application of Liquid Nitrogen and Pelletized Fertilizers by Airplane" was one of the highlights of the meeting. Taking part in the panel were Robert Ueding, Irwin Schenk, John Strauss, Robert Dye, Kenneth Wycoff and William Reddinger.

Brush and weed control were covered in a paper by Clifford Coffman while a panel took over the aspects of controlling legume pests. Participating in this discussion which laid special emphasis on control of spittlebug, clover leaf weevil, sweet clover weevil, leafhoppers, grasshoppers and pollinating insects, were G. E. Lehker, leader; C. R. Weaver; M. C. Wilson; R. T. Everly; Irvin Mount and B. A. App.

Dr. H. C. Young brought the group up to date on the status of aerial application for plant disease, with special reference to canning crops, oak wilt etc.

•

May Build Multi-Million Plant

Plans for a $30 million fertilizer plant are reported to be under consideration by Mathieson Mississippi Corporation, a newly-formed joint venture of Mathieson Chemical Corp. and Mississippi River Fuel Corp. The plan would include main plant facilities, costing some $21 million, for which Mathieson Mississippi was granted amortization certificates for the fast tax write-off of 45%. Construction of associated plants and facilities such as river docks would account for the remaining $30 million, according to William G. Marbury, president of Mississippi River Fuel.

•

WILLIAM W. CHADWICK

William W. Chadwick has been appointed district sales manager of the New York Sales office of International Minerals & Chemical Corp., the firm has announced. The announcement, made by A. Norman Into, vice-president in charge of the Potash Division, indicates that Mr. Chadwick will be responsible for the sale and distribution of potash salts for agricultural uses in his area.

IMC Corp. has also announced the election of Arthur R. Cahill as assistant treasurer. He will be on the staff of Robert P. Resch, vice-president and treasurer of the firm.

•

Cyanamid Grants 17 Awards

American Cyanamid Company's program of grants and fellowships to universities this year includes seventeen graduate fellowship awards in chemistry and chemical engineering, the company has announced. The fellowships are awarded to graduate students commencing their final predoctoral year of study and carry a stipend of $1,500 plus full tuition and incidental laboratory fees. They also include $300 for unrestricted use by the Department of Chemistry or Chemical Engineering of the student's university.

University fellowships by Cyanamid for the 1953-1954 academic year are:

Carnegie Institute of Technology; Duke University; Iowa State College; Massachusetts Institute of Technology; Princeton University; Purdue University; Stanford University; The Ohio State University; The Pennsylvania State College; Tulane University; University of Illinois; University of Michigan; University of Minnesota; University of Pennsylvania; University of Rochester; University of Washington; and the University of Wisconsin.

Cyanamid's program of grants and fellowships also includes financial aid for certain medical and agricultural research projects.

•

Hudson Paper Executive Dies

Abraham Mazer, 77, founder and chairman of the board of Hudson Pulp & Paper Co., died March 27 in New York. He was a native of Ukraine and came to the U. S. at the age of 17. His business career began as a one-man jobbing enterprise and grew to its present national proportions with more than 3,000 employees and a gross volume of more than $36,000,000 in 1952.

•

Buck to Wyandotte Corp.

Royce P. Buck has joined the Research and Development Division of Wyandotte Chemicals Corporation, where he will serve as a field representative in the Development Department, the company has announced. He will be concerned with the introduction of new chemical products. Mr. Buck's previous connections include Mallinckrodt Chemical, Lion Oil Company and Eli Lilly and Company.

•

USDA Says "Use Fertilizer"

Farmers were being urged by the U. S. Department of Agriculture in April, to increase their use of fertilizer. The plea was made on the basis of improving farm income.

Although fertilizer prices may advance slightly over the 1951 level, the U.S.D.A. pointed out, in relationship to prospective prices of farm products, it will still pay many farmers to use more fertilizer.

When fixed costs are high, the Department pointed out, it is important to pay particular attention to practices that increase yields. Fertilizer improves hay and pasture and reduces cost of feed production, it was emphasized.

THIS IMPORTANT MITICIDE

Now Available

from GENERAL CHEMICAL

GENITE® 883

p-chlorophenyl p-chlorobenzene sulfonate

ORGANIC MITICIDES
Genite* 883 (p-chlorophenyl p-chlorobenzene sulfonate)
Genite 923 (2,4-dichlorophenyl ester benzene sulfonic acid)
"Aramite"

TDE (DDD)
Technical, Flake
Dust Base (50% TDE)

DDT
Technical, Flake or Granular
Dust Base, 50% & 75%

LINDANE
Technical
Dust Base, 25%, 75%, 95%
Emulsifiable Concentrate, 20%
Oil Concentrate, 20%

BHC
Technical (15%, 36% & 90% Gamma)
Dust Base, 12% Gamma

PARATHION
Dust Base
25% Emulsifiable,
(2 & 4 lbs. per gal. emuls.)

LEAD ARSENATE
Standard
Astringent
Basic

CALCIUM ARSENATE
Standard
Low Lime

FERBAM
Dust Base, (76% Ferric Dimethyl Dithiocarbamate)

ZIRAM
Dust Base (76% Zinc Dimethyl Dithiocarbamate)

WEED KILLERS

TCA • Sodium Salt
90% Dry Powder
50% Liquid Concentrate

Potassium Cyanate
Technical
Cotton Defoliant
Weed Killer

2,4-D
Acid, and Technical Esters

2,4,5-T
Acid, and Technical Esters

Dinitro
Pre-emergence Herbicides

Chloro IPC
Pre-emergence Herbicide

*Reg. U. S. Pat. Office.

The "one-stop" source for all your important Base Materials and Toxicants

Now! General Chemical announces availability of the important *new organic miticide: p-chlorophenyl p-chlorobenzene sulfonate* . . . being sold under General Chemical's "Genite 883" trade-mark. This is the *ovacide-miticide* which has produced such outstanding results against mites in experiment station tests and field use. Here is another of the many important basic materials that General Chemical offers in technical, dust base, and concentrate grades to formulators and mixers.

General Chemical has long been a major supplier of DDT, DDD, Arsenicals, BHC, Lindane, Potassium Cyanate, 2,4-D and other base materials for agricultural insecticides, fungicides and herbicides. Now, General can also be your primary source of p-cholorophenyl p-chlorobenzene sulfonate, "Genite 883."

Come to this "one-stop" source for all the toxicants listed here . . . just call any General Chemical office from coast-to-coast. There's one near you.

Agricultural Chemical Department

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

Serving Agriculture from Coast to Coast

Bowman to be Safety Speaker

Dr. Neal Bowman, National Association of Manufacturers, will be a speaker at the annual meeting of the

DR. NEAL BOWMAN

Fertilizer Section of the National Safety Congress to be held in Chicago, October 19-23, according to J. Lauren Shopen, chairman of the public relations committee of the section.

Dr. Bowman has had many years of experience as an educator, author, lecturer and sales psychologist. He has had a varied career as shipping foreman, retail store manager, trade paper editor and a director of advertising and publicity and is expected to bring to the fertilizer safety section an address packed with practical information.

Members of the program committee have indicated that a program of unusual merit is being arranged for this year's gathering. John E. Smith, Spencer Chemical Co., Pittsburg, Kansas, is chairman of the section; Vernon S. Gornto, Smith-Douglass Co., Inc., Norfolk, Va., vice-chairman; and Thomas J. Clarke, G. L. F., Ithaca, N. Y., is secretary.

Present plans call for the appearance of six speakers who will relate in detail the circumstances surrounding recent accidents in their plants. The talks will include information regarding the nature of the accident, its severity and its cost. In addition, each speaker will describe the investigation conducted following the mishap; pointing out by whom the investigation was made, what it disclosed, and steps taken to avoid repetition of the accident.

A question-and-answer session will enable those in the audience to ask speakers for further details or clarification of any point. The crowd will also be given an opportunity to tell about how similar accidents in fertilizer plants have been controlled.

The original six case histories will cover different types of accidents and are expected to help in the overall reduction of mishaps in the fertilizer industry.

•

Fulton Bag Personnel Changes

Two personnel changes in its Los Angeles operations have been announced by Fulton Bag & Cotton Mills, Atlanta, Ga. William P. Gatts has been made sales manager of the company's Los Angeles operations and William B. Plumb, production manager.

Mr. Gatts has been in the bag industry for 19 years and will be responsible for sales throughout the west coast area. He is a graduate of the Missouri School of Mines.

Mr. Plumb started his career with Fulton in Atlanta, 20 years ago. Since 1936, he has been connected with the Dallas branch where he was production manager before his recent appointment.

•

Portugal to Boost Fertilizer

Expansion of its ammonium sulfate industry for the next six years is indicated for Portugal. The government has allocated 165,000 contos for the development plan.

New Treble Superphosphate Plant Under Way

Above: Air view of Western Phosphate, Inc. plant now under construction near Salt Lake City, Utah. The company reports that completion of the treble superphosphate plant is expected this fall. As shown in the picture, site preparation is complete and several of the buildings are almost completed with installation of equipment progressing rapidly.

Factors contributing to the relatively speedy construction include an unusually mild winter which has enabled work to continue at a rate faster than was at first anticipated.

The plant is a joint venture of American Smelting & Refining Co.; Kennecott Copper Corporation and Stauffer Chemical Co. Work is being done under the direction of Stauffer Chemical Company's engineering department.

Principal raw materials for Western's treble super and ammonium phosphate are close at hand; sulfuric acid from Garfield Chemical Company at Garfield, and phosphate rock from Stauffer's deposits in southwest Wyoming and Southeast Idaho. Finished products will be distributed by Wilson & Geo. Meyer & Co.

Calmonite

AMMONIUM NITRATE-LIME

20.5% NITROGEN

2 FERTILIZERS IN 1
Contains 10.25% quick-acting *nitrate* nitrogen.
Contains 10.25% longer-lasting *ammonia* nitrogen.

GREEN PELLETS READY TO USE
Sized for flow and ease of application in broadcasting, top dressing, side dressing, and irrigation. Non acid-forming.

ECONOMICAL SOURCE OF N
At low cost, Calmonite furnishes Nitrogen in the 2 forms needed by all plants — for rapid, early vigorous growth and sustained development.

SUPPLIES CALCIUM, TOO
Contains 35% to 40% calcium carbonate, secondary plant-food essential to soil productivity and good crop yields.

NOW AVAILABLE, F.O.B.
Regular Atlantic and Gulf ports, in even-weight, 6-ply paper bags with 2 bituminous liners.

LOOK AT CALMONITE!
Write for a sample and for additional information today.

EXCLUSIVE DISTRIBUTORS FOR
RUHR-STICKSTOFF AKTIENGESELLSCHAFT,
BOCHUM, GERMANY

H. J. BAKER & BRO.
600 Fifth Avenue, New York 20, N. Y.
Branch Offices
Baltimore, Chicago, Savannah & Tampa

H. J. BAKER & BRO.

Two CFA Meetings Scheduled

May 7 & 8 were the dates set for the first California Fertilizer Conference being held in Marysville, California. According to Sidney H. Bierly, Association secretary, the program was to include reports on fertilizer research, with the meeting agenda geared to the interest and education of industry management as well as salesmen, dealers and farmers. Officials from the University of California were expected to be on hand, as well as representatives of the Soil Conservation Service.

The first day's program, including a field trip, was to be sponsored by the California Extension Service.

Mr. Bierly also reminds the agricultural chemical trade in the west that the 30th annual convention of CFA will be held Monday and Tuesday, November 9 and 10 at Hotel LaPlaya, Carmel, Calif. He urges those expecting to attend, to make hotel reservations as soon as possible, since a large registration is anticipated.

•

To Ag Ammonia Institute

Jack F. Criswell, a member of the National Cotton Council's production and marketing division staff since 1948, became executive secretary of the Agricultural Ammonia Institute, effective May 1. Headquarters of the AAI, a national service organization made up primarily of distributors and manufacturers of anhydrous ammonia, is at Memphis, Tenn.

Mr. Criswell has a broad agricultural background, having been with the North Carolina Extension Service for many years and also in the USDA Bureau of Agricultural Economics, and the Production and Marketing Administration.

As a major in the agricultural section, economic division of SHAEF, during World War II, he spent three years in agricultural planning work in Europe.

With the Cotton Council, most of his activity has been in the field of production education, particularly in cotton mechanization. He has coordinated the program planning and handled most of the details of the annual Beltwide cotton mechanization conferences sponsored by the Council. These have included the

JACK F. CRISWELL

conferences in Lubbock, Texas; Bennettsville, S. C.; Greenville-Stoneville, Miss.; Chickasha, Okla.; and the San Joaquin Valley of California.

•

Erosion Control Conditioner

A synthetic soil conditioner to help control rain and wind erosion has been announced by the Organic Chemicals Division of Monsanto Chemical Company, St. Louis, Mo.

John L. Hammer Jr., director of marketing for the division, said that the product, "Bondite" soil conditioner, is designed to stabilize aggregates on the soil surface to hold the seed and soil in place until vegetative cover crops germinate and become established. He said that "Bondite" soil conditioner should be of great help in preventing "costly and disfiguring erosion of all kinds."

According to the company, the conditioner is ordinarily effective at the rate of one pound per 100 square feet, or 436 pounds per acre. Half this rate has proved effective under some conditions. It may be applied as a powder or as a water solution.

•

No Vaporizers for Interiors

The Interdepartmental Committee on Pest Control has issued a statement on the health hazards of insecticide vaporizers used as fumigators for the control of insects, in connection with its seventeenth regular meeting on March 27.

Text of the statement says, "Because of the health hazard inherent in the misuse of insecticide vaporizers as so-called fumigators, the Interdepartmental Committee on Pest Control recommends against their use in living quarters."

The statement was issued by S. W. Simmons, Technology Branch, Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga. and M. Alpert, secretary of the committee. Mr. Alpert is with the Chemistry Branch of the Bureau of Ships, Department of the Navy, Washington 25, D. C.

New Refining Plant for United Clay Mines Corporation in S. C.

Completion of its new clay refining plant at North Aiken, S. C., has been announced by United Clay Mines Corporation, Trenton, N. J. The new plant, shown above, will produce airfloated dusting clays for the agricultural industry. Equipment installed at the plant is said to be modern in every respect. A private railroad siding for boxcar shipments is maintained by the company and in addition, facilities are available for handling material in truckload quantities.

New Phillips Plant Under Way

Phillips Chemical Company has announced that construction of new triple superphosphate fertilizer plant at Adams Terminal on the Houston ship channel is now under way.

The new plant, with a capacity of 405 tons per day of granulated triple superphosphate, will be integrated with existing facilities of Phillips ammonium sulfate operations at Adams Terminal. Construction is being handled by the Rust Engineering Company.

The contract includes construction of additional dockside facilities, three 5,000-ton silos for bulk storage of phosphate rock, new bagging equipment, and complete new processing facilities for manufacturing phosphoric acid and triple superphosphate, as well as expansion of the ammonium sulphate plant.

Extensive facilities are being provided to assure elimination of plant fumes, including an extensive fume scrubbing system.

The new plant is an expansion of Phillips fertilizer manufacturing facilities since it will add phosphorous to the company's products. Raw materials will be phosphate rock shipped from Florida mines, and sulfuric acid, a part of which will be manufactured from sulfur produced by Phillips Chemical Company in West Texas. Construction is scheduled for completion this fall.

•

NAC To Observe 20th Year

The National Agricultural Chemicals Association will observe its 20th anniversary during the annual meeting at Spring Lake, New Jersey, September 9, 10, and 11, according to Lea S. Hitchner, executive secretary of the Association. Headquarters will be at the Essex and Sussex hotel.

"Plans now are that accommodations for the members will be made at both the Essex and Sussex, and the Monmouth Hotel," Mr. Hitchner stated, "because our membership has grown to the point where the Essex and Sussex can no longer accommodate all of the representatives." He reported that over 500 persons attended the annual meeting last year and an even larger number are expected for this meeting.

As a special feature of the program a panel of seven ex-presidents of the association will be asked to discuss the industry's status and to compare the present-day marketing activities, production and technical problems of the industry with those of former years.

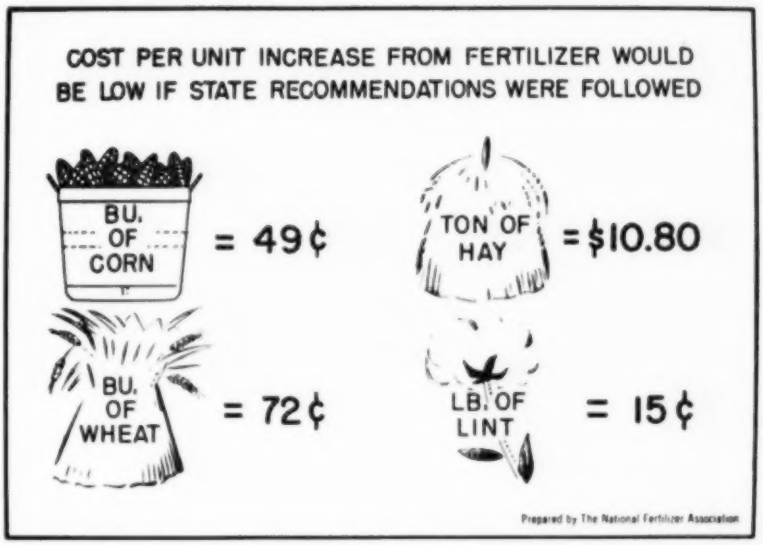
The arrangements committee of the Association has announced preliminary plans for observance of the 20th anniversary and for the program of the 3-day meeting. The tentative program calls for a formal session on the morning of each of the 3 days with reports by the association officers. Members of the association will have the opportunity to hear addresses by officials of government agencies and by members of the industry. During one session, members will have an opportunity to discuss various technical problems including the formulation of pesticidal chemicals, effects of pesticides on soils, legislative trends, and exports.

FERTILIZERS ARE A SUBSTITUTE FOR ACREAGE

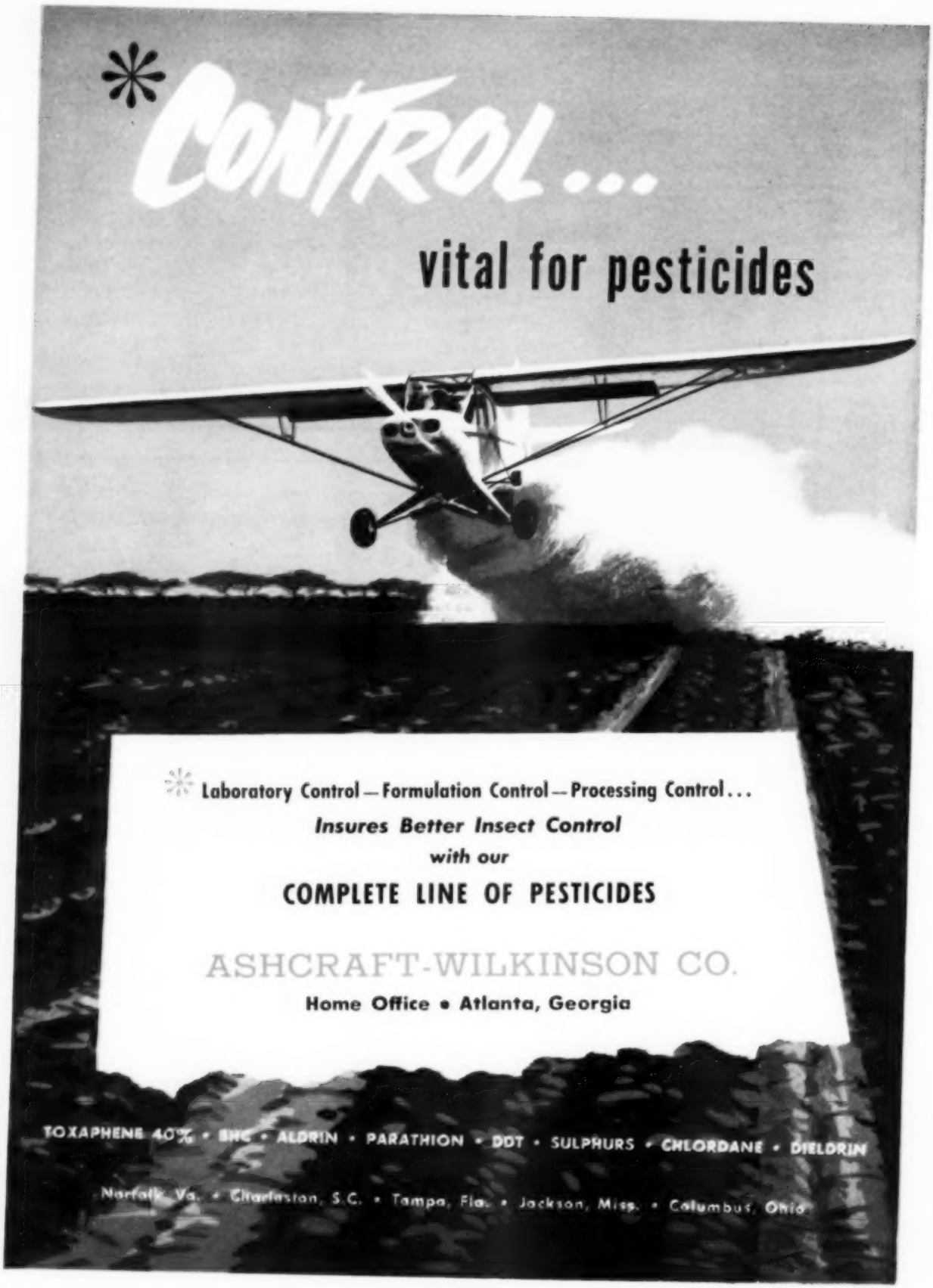
CROP	CURRENT ACREAGE* (in millions)	ACREAGE REQUIRED IF RECOMMENDED FERTILIZER RATES WERE FOLLOWED (in millions)	EXTRA FERTILIZER COSTS	NET SAVINGS
CORN	87	70	$181,000,000	$500,000,000
WHEAT	63	55	60,000,000	148,000,000
COTTON	22	20	64,000,000	113,000,000
HAY	75	60	196,000,000	130,000,000

* 1941-1950 AVERAGE

Prepared by The National Fertilizer Association



Practically self-explanatory, the above figures have been prepared by the National Fertilizer Association to illustrate how production can be maintained and profits increased even though acreage should be reduced. (Top chart) The lower figure shows the unit cost of the increased production which could be brought about by wise use of fertilizer materials.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NEWS *Brevities*

NET SALES OF INTERNATIONAL Minerals & Chemical Corp. were up 7.8% for the nine months ended March 31, according to Louis Ware, president. The figures were $62,994,231 for the latest period against $58,421,381 for the preceding one.

•

THE ANNUAL FIELD DAY of the Connecticut Agricultural Experiment Station will be held Wednesday, August 19, at Mt. Carmel, Conn. Soils research will be featured according to J. Peter Johnson, general chairman.

•

INDIA'S SINDRI FERTILIZER PLANT, expected to reach its capacity production of a thousand tons a day of ammonium sulfate this spring. Early in January it had reached a daily average of 943.7 tons daily and production was increasing steadily.

•

THREE NEW APPOINTMENTS at American Cyanamid Company's plant now under construction near New Orleans, Louisiana, include F. R. Keller, assistant chief plant engineer; T. S. Button, senior mechanical engineer; and L. T. Loughridge, utilities superintendent. G. J. Forney, manager, has announced.

•

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS held its first engineering management conference in Detroit, Mich., April 15 & 16.

•

FOOD MACHINERY & CHEMICAL CORP., San Jose, Calif. has acquired controlling interest in Varley Pumps & Engineering, Ltd., of Brentford, England. The move is reported to be part of FMC's program of expanding foreign manufacturing operations in the interest of maintaining and servicing world-wide markets.

•

LION OIL COMPANY has received two National Safety Council awards for its accident-prevention record of 1952. The citations were for reduction of both severity and frequency of accidents. With more than 2,600 Lion employees, three million man-hours were worked without an accident.

•

THREE CONTESTS, state-wide, are being launched in South Carolina under supervision of Clemson Extension Service. They are the 5-acre cotton contest; corn contest and green pastures contest. Wide publicity is being given the event which involves use of fertilizer, and pesticides. Cash prizes are offered in each category.

•

ALAN S. EVANS, JR., has been named manager of the coal chemicals division of Pittsburgh Coke & Chemical Company, to perform duties formerly discharged by Mr. F. D. Schreiber, who died March 22.

Mr. Evans joined Pittsburgh Coke in 1942.

•

MATHIESON CHEMICAL CORPORATION'S sales and net earnings for the first quarter of 1953 were at a record high, the firm has announced. Net sales were $60,515,173, an increase of 13.5% over the combined sales of Mathieson and E. R. Squibb & Sons during the same period last year. (Squibb was merged into Mathieson last October.)

ILLINOIS CUSTOM OPERATORS' TRAINING SCHOOL will be held at the University of Illinois, Urbana, on January 21 and 22, 1953, according to H. B. Petty, in charge of the annual event. Further details as to program will be announced later.

•

WESTVACO CHEMICAL DIVISION, Food Machinery & Chemical Corp., New York, has named Gordon A. Cain as general assistant to the operating vice-president, W. N. Williams. Mr. Cain is a chemical engineering graduate of Louisiana State University and was formerly associated with Freeport Sulphur Co. and Merck & Co.

•

"WORLD PRODUCTION OF RAW MATERIALS" has been published by the Royal Institute of International Affairs, London. It is said to be a completely revised edition of the work originally published by the Institute in 1941. Included are chapters on fibers, agricultural products such as rubber, synthetic rubber, timber, and tobacco; metals; and non-metallic minerals. In the latter category are included crude sulphur, phosphate rock and potash. The New York publications office is at 542 Fifth Ave., New York 19. Price of the 104-page book is $1.50.

•

NEOSHO FERTILIZER, INC. has been organized at Chanute, Kansas. Officers are: Shelton D. Propst, president; Kenneth C. Keas, first vice-president; William A. Sailors, second vice-president; Robert L. Briley, secretary; and J. F. Cooper, treasurer. Directors: K.C. Keas, D.D. Mitchell, H. E. Davis, R. E. Cooper and Messrs Propst and Briley. Plant manager will be Mr. Davis, now manager of a fertilizer plant at Lawrence, Kans. Capacity of the new plant is expected to be 5,000 tons a year.

•

PLANS TO DISCONTINUE the Japanese beetle quarantine program have been announced by the U. S. Dept. of Agriculture. Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine told a Senate

(*Turn to Page* 133)

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June 30, July 1 and 2, Dates Set for Washington State Fertilizer Meet

SPEAKERS representing the fertilizer industry in the northwest, the Washington State College, and soil science will be featured at the fourth annual Fertilizer Conference of the Pacific Northwest Plant Food Association meeting June 30 and July 1 & 2. The meeting will be held at W.S.C.'s new Union Building, Pullman, Washington. Some three hundred persons from the area are expected to attend.

Above: Washington State College's new Union Building, where Pacific Northwest Plant Food Association will meet. Speakers representing a wide area of the U. S. are scheduled to appear on the program.

The National Fertilizer Association and the American Plant Food Council, Inc., Washington, D. C. will be represented by W. R. Allstetter and J. R. Taylor, Jr., respectively; and an address of welcome will be presented by C. C. French, Washington State College president. E. B. Shipley, Swift & Co., North Portland, Ore., Pacific Northwest Plant Food Association, will address the group on the first day, according to the advance program issued by B. R. Bertramson, Washington State College, chairman of the program committee.

A pre-conference meeting is scheduled for June 29 at Wilson Hall, Washington State College, Pullman, to discuss on a technical level soil testing, tissue and foliar analysis and their interpretation, Dr. Bertramson said.

The first day's session under chairmanship of Horace B. Cheney, Oregon State College, Corvallis, will include talks by Bob Whiting, Swift & Co., North Portland, Oregon; F. T. Tremblay, Washington Cooperative, Seattle; George D. Scarseth, director of research, American Farm Research Association, Lafayette, Ind.; Glenn Horner, U.S.D.A., Washington State College; George Wickstrom, American Potash, Inc., Sumner, Washington and H. W. Smith, agronomy department, Washington State College, who will present an illustrated lecture on soils of Washington at an informal dinner on the evening of June 30.

James Kraus, director of experiment stations, University of Idaho, Moscow, Ida., will be chairman of the second day's session which will include on its program the following: C. D. Moodie, agronomy dept., W.S.C.; Eric Winters, T.V.A., Knoxville, Tenn.; Walter H. Gardner, agronomy dept., W.S.C.; and Ray Pendleton, Oregon State College, Corvallis (the latter two presenting a paper on soil conditioners); Nels Benson, Tree Fruit Experiment Station, Wenatchee, Wash.; George Darroch, W.S.C.; Robert Luckhardt, Agriform Co., Costa Mesa, Calif.; C. Emlen Scott, Plant Pathology Dept., University of California, Berkeley; F. T. Tremblay; Dr. M. T. Buchanan, director, experiment stations, W.S.C.; and George D. Scarseth, Lafayette, Ind.

Dr. J. C. Knott, director, Institute of Agricultural Sciences, W.S.C. will be chairman of the July 1st afternoon session. Others to appear on the program include W. A. Starr, W.S.C. agronomy department; Emil Nelson, U.S.D.A. Irrigation Experiment Station, Prosser, Wash., who will present a summary of fertilizer results from basin research; John Robins, Prosser, Washington, "Water Management in Relation to Commercial Fertilizer Use"; and Frank Viets, Prosser, Wash., "Zinc Deficiency in the Columbia Basin."

"Industry and Agriculture Team on Phosphorus Research" is the title of a paper to be presented by Vincent Sauchelli, Davison Chemical Corp., Baltimore, Md.; and Larry G. Monthey, American Society of Agronomy, Madison, Wisconsin will address the group as final speaker of the day.

The final day will be devoted to tours which will include the Moses Lake pre-development farm and experimental work; a tour of Grand Coulee Dam; and a tour of soils and crops experimental areas in the Columbia basin and at the Washington Tree Fruit Experiment Station, Wenatchee, Wash.

•

German Pesticide Output Up

Production of insecticides and fungicides in Germany is regarded as adequate, with about 80 firms making some 1,000 products, it is reported. About 30% is exported.

Combustion Eng. Name Officers

Stockholders of Combustion Engineering—Superheater, Inc. have voted to shorten the company name to "Combustion Engineering, Inc."

The board of directors also elected the following officers to new posts: Joseph V. Santry, president, was elected chairman of the board and will continue as chief executive officer; Samuel G. Allen retired as chairman of the board but will continue as chairman of the executive committee; Martens H. Isenberg, executive vice-president, was elected president, succeeding Mr. Sentry; George D. Ellis, vice-president and controller, was appointed vice-president in charge of finance, to succeed Harold H. Berry who retires, but will continue as a director.

The company's Raymond Division manufactures milling equipment for insecticide plants. Its "Imp" mill is used in connection with the "Whizzer" separator for grinding and blending formulations.

•

To Head Westvaco Engineering

Robert J. DeLargey, formerly general assistant to the operating vice-president, has been appointed director of engineering by the Westvaco Chemical Division of Food Machinery Chemical Corporation.

Mr. DeLargey, before joining Westvaco in 1951, was assistant general manager of Grove Regulator Company of Oakland, California, and former superintendent of Shell Chemical's ammonia plant in Pittsburg, California. He is a chemical engineering graduate of Case Institute of Technology.

LISTENING *Post*

Mixed Fungicides for Apple Scab & Quince Rust Control

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

USE of fungicide mixtures on apples for several years has been a common practice in the Hudson Valley where it is necessary to protect apple trees from cedar-apple or quince rust (*Gymnosporangium juniperivirginianae, G. clavipes*) as well as apple scab (*Venturia inaequalis*). Sulfur-ferbam mixtures are commonly used in this connection. Such mixtures not only gave excellent control of the rust diseases but also showed improved scab control compared with the control obtained with either fungicide used alone.

According to D. H. Palmiter of the New York State Agricultural Experiment Station, and F. H. Emerson, of the Stauffer Chemical Company, the idea for improving apple scab control further by mixing eradicant and protectant types of fungicides, apppeared promising in previous field experiments. Some mixtures proved to be more compatible and complementary than others. Certain mixtures increased the danger of host injury while others appeared to reduce it. Half doses of two different fungicides were too expensive to be practical while others were quite economical, considering the improved disease control and fruit finish.

The results of combinations tested in 1952, show typical reactions between certain fungicide combinations. McIntosh, Cortland, Delicious, and Golden Delicious varieties were in the experimental orchard but not all varieties were available for each treatment. The fungicides were mixed in the spray tank and arsenate of lead was used as the insecticide, with all of the treatments starting with the petal-fall application. "Sulphenone 50-W" was added at the rate of 2 pounds per 100 gallons in the fourth cover spray for mite control. The differential treatments started with the green-tip spray and carried through the first cover on June 2. All plots, with the exception of one "406" plot, were then sprayed with "Fermate" in the following cover applications. In order to determine the value of the mixtures, the applications were made at approximately weekly intervals without regard to the occurrence of infection periods. Conditions were favorable for scab infection in the 1952 season, and nine infection periods occurred during April, May, and early June when the differential treatments were being used (Table 1)

Under the conditions of this experiment, protectant fungicides, including "Magnetic 70" sulfur paste, "Fermate," and "Crag Fungicide 341," averaged 64, 15, and 22 percent fruit infection respectively. Under the same conditions, fungicides with some eradicant properties, including "Phygon XL," "Coromerc," and "Fungicide 406" [captan], averaged 3, 5, and 2 percent fruit scab

TABLE 1

Apple Spray schedule in relation to infection periods
Rock City, New York, 1952

Spray Schedule*	Date Applied	Primary infection periods			
		Rain began	Trees wet (hours)	Temperature (°F.)	Rainfall (inches)
		April 13	36	45	0.55
Green-tip	April 14				
Delayed Dormant	April 22				
		April 24	64	55	1.20
		April 27	41	56	0.84
Pre-pink	April 28				
Pink	May 3				
		May 10	45	52	1.43
Petal-fall	May 14				
		May 17	18	54	0.19
		May 20	38	54	0.48
Special	May 22				
		May 25	56	60	1.15
		May 29	14	55	0.35
		June 1	22	64	3.43
1st cover	June 2				

*Fermate 1½-100 was used in the second to fifth cover on all but one 406 plot, and the spray dates were June 13 and 23 and July 7 and 23.

respectively. "Phygon," however, caused considerable fruit russet, and "Coromerc" failed to control quince rust on Cortland and Delicious trees and caused serious leaf injury. "Fungicide 406" looked promising.

Several combinations of "Magnetic 70" paste and "Phygon" were included in the experiment. "Phygon" was wet-ground and formulated with the sulfur paste at the rate of 1 and 2 ounces in a 4 pound unit of paste. The 1-ounce mixture at 4-100 resulted in 26 percent fruit scab, whereas the 2-ounce mixture showed 5 percent scab but increased the amount of fruit russet on McIntosh from 9 to 16 percent. The tank mixture of sulfur with "Phygon XL" 4-¼-100 resulted in 9 percent scab and 11 percent russet. Cortland trees were not available in the sulfur-"Phygon" plots so quince rust data were not available there. Under the conditions of this experiment, nothing was gained by mixing "Magnetic 70" with "Phygon," since the "Phygon-XL" at ½-100 afforded better scab control and caused less injury than the mixtures (Table 2).

A mixture of "Crag 341" with "Coromerc" 1½ pints -¼ pound -100 resulted in 9 percent scab and 10 percent fruit russet on McIntosh and 7 percent quince rust on Cortland. Under the conditions of this experiment the mixture did not prove worth while.

Tank-mixed "Fermate" and "Coromerc" ¾-¼-100 resulted in better scab control (2 percent) than was obtained with either fungicide alone. Quince rust control on Cortland was as good as that obtained with "Fermate" alone. Leaf injury was less than with "Coromerc" alone and fruit russet was about the same as with "Fermate" alone (6 percent). Such ferbam-mercury mixtures may find a place in the early season apple spray program in areas where both scab and rust diseases are serious problems. They would be of special value to those growers who cannot cover their orchards quickly enough to use a protectant fungicide schedule.

"Fermate" used with "Phygon-XL" at ¾-¼-100 resulted in very good scab and quince rust control and caused less fruit russet than was caused by either fungicide used alone (Table 2). Similar results have been obtained with this combination used early in the season during the past four years. The "Fermate" seems to act as a safener for the "Phygon" and the "Phygon" greatly improves the scab control.

"Fungicide 406" at 2 pounds to 100 showed both protectant and eradicant properties in this experiment and performed in a manner similar to that of the better fungicide mixtures. Where it was used throughout the season it showed better fruit finish than any other treatment on the Golden Delicious variety (Table 3). Where "406" was followed by "Fermate" in the last three cover sprays, the fruit finish was about the same as that obtained with the straight "Fermate" program, indicating that this injury occurred in June and July when the highest temperatures prevailed. Quince rust control with 406 on Cortland and Delicious varieties was not significantly different from

TABLE 2

Results of fungicide mixtures on scab and quince rust control on apple. Rock City, New York, 1952

Treatment[a]	Perfect infection					
	McIntosh		Cortland		Delicious	
	Scab	Russet	Scab	Rust	Scab	Rust
Magnetic "70" sulfur, 6-100[b]	64	–				
Phygon-XL, ½-100	3	10				
Magnetic "70" & Phygon 1oz.4-100	26	9				
Magnetic "70" & Phygon 2oz.4-100	5	16				
Magnetic "70"-Phygon-XL 4-¼-100	9	11				
Crag 341-lime, 3pts.-½-100[c]	22	9	15	4	53	6
Coromerc[d], ½-100	5	4	6	3	9	4
Crag-Coromerc, 1½-¼-100	9	10	7	7	6	5
Fermate, 1½-100	15	6	8	9	10	0
Fermate-Coromerc, ¾-¼-100	2	6	3	tr.	–	–
Phygon-XL, ½-100	3	10	3	1	–	–
Fermate-Phygon-XL, ¾-¼-100	3	4	–	–	1	0
Fungicide 406[d], 2-100	2	5	2	1	1	1
Fungicide 406, 2-100 & 1-100[e]	1	2	1	1	1	1

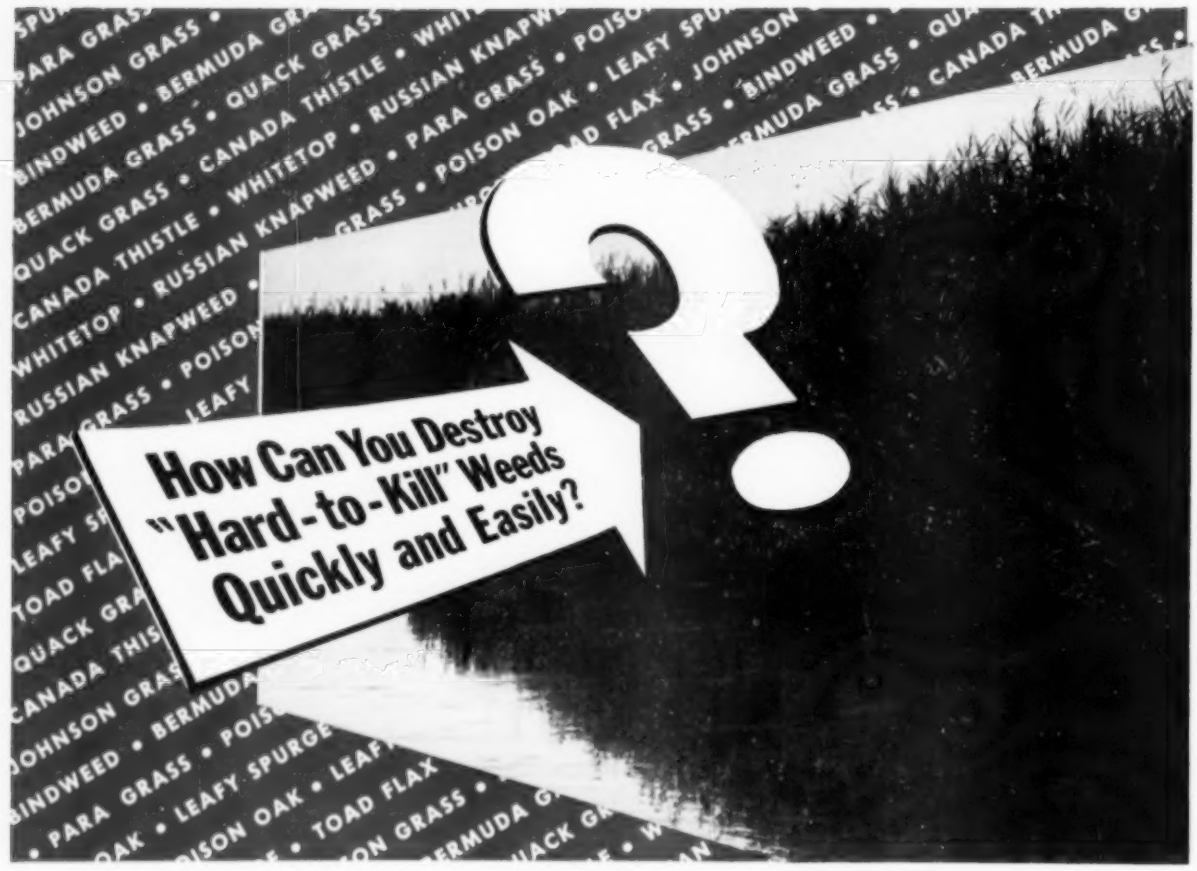
[a]Fermate 1½-100 was used on all plots (except one 406) in second to fifth covers.
[b]Magnetic "70" concentration was reduced to 4-100 after bloom.
[c]Crag 341 concentration was reduced to 1⅓ pints after bloom.
[d]Fungicide 406 = 50% active N-trichloromethylthio-tetrahydrophthalimide. Coromerc = 10% active N-phenylmercuriethylenediamine.
[e]Fungicide 406 was used all season at 2 pounds to 100 early and 1 pound to 100 in covers.

TABLE 3

Russet injury on Golden Delicious in relation to the use of fungicide mixtures in 1952

Treatment[a]	Percentage of fruit			
	None	Slight	Moderate	Severe
All season				
Fungicide 406	78	19	3	0
Fermate in cover				
Fungicide 406	25	53	21	2
Phygon-XL	24	46	27	3
Coromerc	10	52	37	1
Crag 341	11	51	37	2
Crag-Coromerc	11	47	40	3
Magnetic "70"-Phygon 1 oz.	1	24	69	6

[a]Arsenate of lead 3-100 was used with all treatments starting with the petal fall application. Sulphenone 50-W was added to fourth cover spray for control of red and two-spotted mites.



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"Fermate" in this test, and both varieties showed better control than that obtained with "Coromerc" or "Crag." "Fungicide 406" would be expected to give commercial control if applications were well-timed, but other tests indicate it is not the equivalent of "Fermate" for rust control.

In conclusion, the 1952 experiments with fungicide mixtures in general confirm the results of previous tests. Under Hudson Valley conditions, "Phygon"-"Fermate" combinations have given much better results than "Phygon"-sulfur combinations. "Fermate"-mercury mixtures, when confined to the cool early-season applications, have provided good apple scab and rust control without serious injury. "Crag"-mercury combinations are not suitable for the Hudson Valley since they do not control the rust diseases. "Fungicide 406" may reduce the need for these mixtures if further tests substantiate its 1952 performance.

Boll Weevil Winter Survival High in La. and S. Carolina

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the Division of Insect Detection and Identification, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

SPRING examination of ground trash to determine boll weevil survival in Madison Parish, Louisiana and Florence County, South Carolina shows exceptionally high counts. In Madison Parish, Louisiana, two hundred ground trash samples were collected and examined for surviving boll weevils between March 2 and 18, 1953. The number of live weevils per acre, trash, found per point (ten, 18 square foot samples) ranged from 0 to 6,050, with the average being 1,149 per acre. This figure is 89 percent of the number (1,295) found in the 1952 fall hibernation examination. This represents a very high survival, being about 1½ times the average found during the past 17 years. There are only four years (1945, 1949, 1950, and 1951) in which a greater number was found than in 1953. Table 1 shows the summary of fall and spring ground trash examinations made at Tallulah, Madison Parish, Louisiana, for the past ten years.

In Florence County, South Carolina, 430 square yards of ground trash were collected from 43 farms and examined between March 10 and 30, 1953. The number of surviving boll weevils ranged from 0 to 32,428 per acre of surface trash, with the average being 5,932. This is 94 percent of the number (6,259) found in hibernation in the 1952 fall trash examination. The average number found this spring is about 2 times the average found during the past 16 years. With the exception of 1950, it is the highest number per acre found in spring examinations since records have been maintained. Table 2 shows the summary of fall and spring ground trash examinations made in Florence County, South Carolina for the past ten years.

In Georgia, spring examinations of surface trash to determine the number of boll weevils surviving the winter were made in four regions of the State from March 9 to April 1. Ten samples or 180 square feet of surface trash, were examined from each of 25 fields. Nineteen, or 76 percent of the fields examined were found infested. The maximum number of weevils found on one farm (Gordon County) was 4,114 per acre of trash. The average was 1,055 live weevils per acre of surface trash. Based on the number of weevils found during the fall trash examination, this represents a winter survival of 78 percent for the State.

The survey showed considerably more weevils present in the northern half of the State. The averages for the different areas were as follows: northwest (Gordon County), 2,081; north central (Spalding County), 1,283; east central (Burke County), 581; and south (Tift County), 48. The 1952 spring survival for the State averaged 1,244 weevils per acre surface trash.

In Alabama, spring examination of surface trash was made in

TABLE 1

Year	FALL EXAMINATIONS Number of Samples	FALL EXAMINATIONS Live Boll Weevils per Acre	SPRING EXAMINATIONS Number of Samples	SPRING EXAMINATIONS Live Boll Weevils per Acre	Per Cent Survival
1943-44	250	2,488	120	625	25
1944-45	160	2,435	160	1,512	62
1945-46	200	4,199	200	1,065	25
1946-47	200	2,698	210	426	16
1947-48	150	1,178	150	177	15
1948-49	150	2,146	150	1,710	80
1949-50	200	3,231	200	2,202	68
1950-51	200	4,586	200	1,742	38
1951-52	200	1,367	200	629	46
1952-53	200	1,295	200	1,149	89

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Tennessee's trace minerals are soluble and their nutritional value is immediately available to the plant. Soluble trace minerals are more economical and faster acting.

TENNESSEE TRI-BASIC COPPER SULPHATE

TRI-BASIC Copper Sulphate is a chemically stable copper fungicide containing not less than 53% metallic copper. TRI-BASIC Copper Sulphate can be used as a spray or dust on practically all truck crops and citrus crops. Control persistent fungus diseases—correct copper deficiencies from a nutritional standpoint. Use TC TRI-BASIC Copper Sulphate.

COP-O-ZINK NEUTRAL COPPER ZINC

COP-O-ZINK is a new, neutral copper-zinc fungicide containing 42% copper and 11% zinc. COP-O-ZINK gives a superior performance in control of fungus diseases. COP-O-ZINK composition of two essential elements gives it added value in correcting deficiencies of zinc and copper and in stimulating plant growth. COP-O-ZINK is compatable with all inorganic and organic insecticides. No lime is required. For use in spraying or dusting.

NU-Z NUTRITIONAL ZINC

NU-Z contains 52% metallic zinc. It is a neutral zinc compound which does not require the addition of lime for direct foliage application. NU-Z gives excellent coverage and adherence to plant foliage, thus rendering it available over a longer period of time. Safe for direct application. For zinc deficiency and plant nutrition—use as a spray or dust.

FERRIC IRON SULPHATE

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TENNESSEE CORPORATION

617-29 Grant Building, Atlanta, Georgia

four counties. Live weevils found varied from none in 12 samples examined in Limestone County (north central Alabama) to 6,290 per acre of trash, 10 samples, in Lee County (east central Alabama). An average of 403 weevils per acre of trash was collected from 12 samples in Marion County (northwestern Alabama) and 968 in 15 samples from De Kalb County (northeastern Alabama). The spring population in Lee County was only one half of that found in the fall trash examination made in December 1952.

In the Waco, Texas, area boll weevil overwintering studies are conducted by the placing of 500 field collected weevils in each of 10 cages on or about November 1. These cages are then examined during January, February, and March for weevil activity. Examinations during the first three months of 1953 indicate activity very similar to that of 1950 when the seasonal survival was 4.3 percent.

With the mild winter of 1952-53 a high boll weevil survival is indicated for the central Texas area this year. Removal of surviving boll weevils from the cages for seasonal survival counts begins on May 1 of each year. Hibernation cage studies made in the Waco, Texas, area for the past 10 years are shown in Table Three.

In North Carolina, winter survival examinations were made in January and February 1953. Three hundred square yards of surface trash were examined in six counties of North Carolina. These examinations showed the presence of live weevils at various rates from 968 to 10,164 per acre of trash with an average of 3,920. There were no trash examinations made in the fall of 1952, therefore there is no basis for determining the percentage of survival.

In McNairy County, Tennessee, spring survival examinations were made of 95 samples taken from 19 fields between March 9, and April 17, 1953. Results indicate that a minimum of 26 percent of the boll weevils that went into hibernation last fall in that county survived the winter. Fall counts were 2,260 per acre of trash compared to 590 this spring. Spring sampling conditions were adverse and the true survival rates might be slightly higher than that indicated.

In a report dated April 16, 1953, it was stated that boll weevils seem to be on the increase throughout the Rio Grande Valley of Texas. However, the numbers at that time were not alarming, but growers were urged to watch their fields to determine when controls might be needed.

Fruit Insect Activity

WINTER survival of plum curculio adults in hibernation at Fort Valley, Georgia was 90.1 percent. This is the highest percentage of winter survival in Georgia during 33 years of observations and records. However, the population entering hibernation last fall was generally lighter then that of an average year. The first adult taken from a peach tree at Fort Valley this season was found March 13, with numbers appearing by March 16. Plum curculio adults were jarred from trees March 23 at Hazelton, Indiana and March 24 at Pulaski County, Illinois. Adult population was described as light in southern Indiana and Illinois by mid-April, but egg deposition was heavy in the Fort Valley, Georgia area.

Codling moth carry over was heavier in the Vincennes, Indiana area than for many seasons. Larvae examined on trunks of trees March 16 had only 7.4 percent dead in 162 larvae. In one local Vincennes area orchard, it was not difficult to find as many as 100 larvae per tree. In the northeastern area of Kansas, codling moth were reported to have overwintered in good condition.

Red-banded leaf roller adults were first observed in Vincennes, Indiana orchards March 17. There was a light winter carry over for the

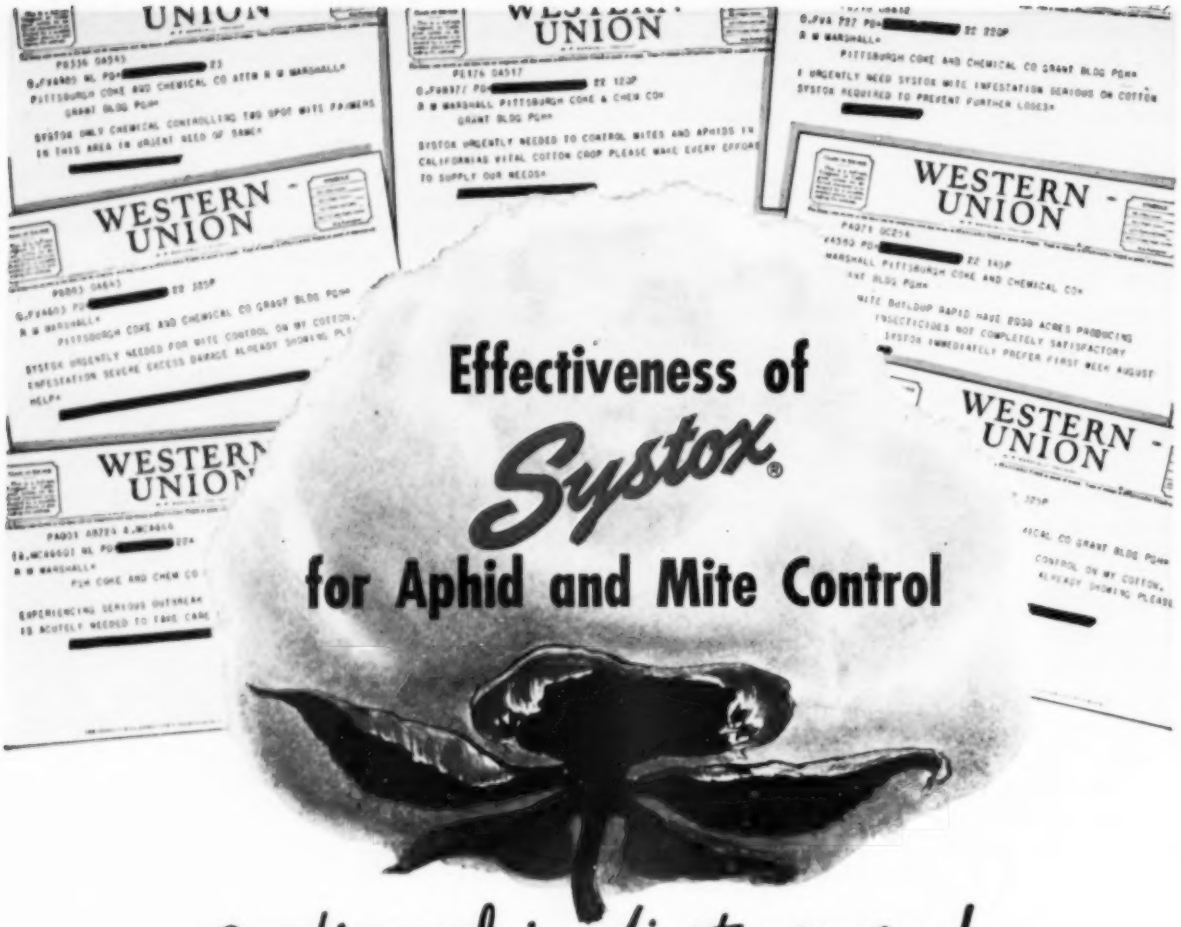
(*Turn to Page* 133)

TABLE 2

Year	FALL EXAMINATIONS No. of Sq. Yds. Examined	FALL EXAMINATIONS Live Weevils per Acre	SPRING EXAMINATIONS No. of Sq. Yds. Examined	SPRING EXAMINATIONS Live Weevils per Acre	Per Cent Survival
1943-44	140	1901	140	1210	63.6
1944-45	150	4324	150	2580	59.7
1945-46	150	4800	150	2193	45.3
1946-47	—	——	100	2904	——
1947-48	170	3974	200	2710	68.2
1948-49	200	3969	200	3969	100.0
1949-50	200	10744	200	11108	100.0
1950-51	200	4816	190	2267	47.1
1951-52	200	1573	200	653	41.5
1952-53	440	6259	430	5932	94.8

TABLE 3

Year	No. of Weevils Installed	Av. no. weevils active each inspection Jan.	Feb.	March	Percent Seasonal Survival
1944	5000	0	0.4	20.0	2.80
1945	5000	2.7	8.8	21.8	3.44
1946	5000	1.9	2.6	4.9	1.32
1947	5000	0.02	0.06	0	0.18
1948	5000	15.9	0.09	0.8	0.22
1949	5000	7.3	0.2	0.6	0.06
1950	5000	5.7	9.0	24.9	4.30
1951	5000	0.2	0	0	0.02
1952	5000	1.2	2.0	0.6	3.24
1953	5000	6.2	5.8	26.5	



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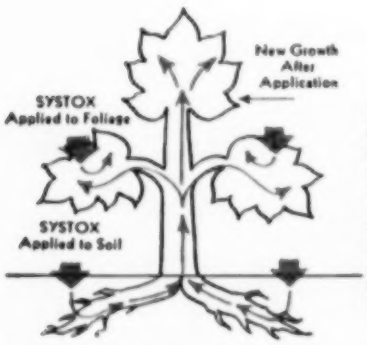

SYSTOX is absorbed through roots or foliage and translocated throughout plant structure, including any new growth developed after application. ® SYSTOX, originally developed by Farbenfabriken Bayer, Germany, is a trademark of Chemagro Corp., New York, New York.

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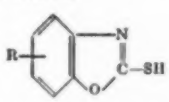
INDUSTRY *Patents*

2,630,249. Liquid Fertilizer Feeder for Irrigation Systems. Patent issued March 3, to Fred R. Bryant and Edward A. Brown, Shafter, California. In a liquid fertilizer feeder apparatus which includes a pressure tight elongated tank for liquid fertilizer, said tank being ground supported in an exposed position with its axis horizontal, an intake fitting on top of the tank adjacent one end thereof, a platform rigidly secured on said end of the tank only and projecting from said end of the tank adjacent but above ground level, a replaceable pressure-gas cylinder seated on the platform and having a flexible conduit removably connected with said fitting, the area of the platform being materially greater than that of the base of the cylinder and being unconfined across its outer end, and a releasable protector guard mounted on said end of the tank adjacent the top and loosely surrounding the cylinder.

2,630,381. Herbicides. Patent issued March 3, to Arthur H. Schlesinger and Milton Kosmin, Dayton, Ohio, assignors to Monsanto Chemical Co., St. Louis, Mo. The method of destroying undesired plants which includes applying to said plants a toxic quantity of a herbicidal composition comprising, as the active ingredient, a benzoxazole derivative having the general formula



in which R is selected from the class consisting of hydrogen, chlorine, the nitro radical, and alkyl radicals of from 1 to 4 carbon atoms.

2,630,945. Spreader for fertilizer, seeds, and the like having removable bottom portion. Patent issued March 10, to Evenhard S. Gandrud, Owatonna, Minnesota. In a machine for distributing granular materials, a horizontally elongated main hopper section having connected front, rear and end walls and an open bottom, cylindrical trunnions disposed below said open bottom and connected to the lower end portions of said end walls with their axes aligned, thereby providing a supplemental bottom section receiving space between said trunnions and below the open bottom of the main hopper section, ground engaging wheels rotatably mounted on said trunnion outwardly of said end walls, a supplemental bottom hopper section having front, rear and end walls and a perforated bottom wall removably disposed within said space, means at the juncture of the main and supplemental sections for rigidly and separably securing said sections together with the respective lower and upper edges of the front, rear and end walls thereof in adjacency, an elongated rotary agitator located in the bottom hopper section, stub shaft members detachably connected at their opposite ends to said ground wheels and said rotary agitator respectively and being rotatably and slidably supported intermediate their ends in apertures in the end walls of said bottom hopper section, whereby upon release of said securing means and the inner ends of said stub shafts from said agitator and axial displacement thereof through the apertures in said end walls, said hopper bottom section may be readily removed from said space while the main hopper section is supported on said ground engaging wheels.

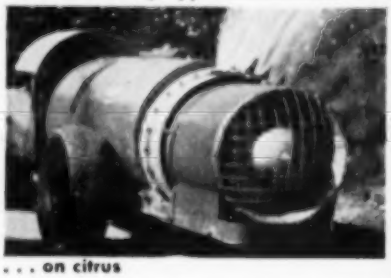
2,631,069. Fertilizer Distributor Bearing. Patent issued March 10, to John H. Starr, Mayville, Wis., assignor to John Deere Van Brunt Co. The combination of a support, a rotatable shaft movable about an axis, a bearing for said shaft, means for detachably mounting said bearing on said support for rotary movement in one direction about said axis, whereby the bearing is disconnectible from said support by a rotary movement in said direction, and a one-way driving mechanism connected to rotate said shaft about said axis only in the other direction.

2,631,084. Ammonium Sulfate Production. Patent issued March 10, to Sam P. Robinson, Bartlesville, Okla., assignor to Phillips Petroleum Company. A process for the production of an improved granular ammonium sulfate which comprises introducing an ammonium sulfate solution to a submerged flame evaporation zone, introducing combustible material to said evaporation zone, burning said combustible material in said zone below the liquid level of said ammonium sulfate and thereby causing the removal of water from said solution and the formation of small crystal nuclei of ammonium sulfate of a length in the range of 1 to 50 microns, said crystal nuclei and said solution forming a magma, removing a portion of said magma to a thickening zone wherein a portion of the solution is removed from the crystals, recycling the separated solution to said evaporation zone for further evaporation, removing another portion of said magma from said evaporation zone and combining therewith the previously thickened magma to form a crystal magma of high crystal solids content, passing said magma of high crystal solids content to a mixing zone wherein it is admixed with recycle dry ammonium sulfate in such quantities that the moisture content of the admixture is not more than 1 to 10 weight per cent, the crystals of said magma and the dry ammonium sulfate adhering to one another in said mixing zone in the form of granules, passing said granules from said mixing zone to a drying zone wherein they are contacted with a drying gas to remove the moisture therefrom, said crystals becoming cemented to said recycle ammonium sulfate by the removal of said moisture and the crystallization of the ammonium sulfate from which said moisture is removed, passing said drying gas to a separation zone wherein entrained ammonium sulfate fines are removed, passing said fines to said mixing zone as recycle ammonium sulfate, separating said ammonium sulfate granules from said dryer and selecting granules of a desired size, recycling granules of too small a size to said mixing zone, passing granules of too large a size to a crushing zone and crushing same to smaller size, recycling said crushed ammonium sulfate granules to said mixing zone, and recovering the granules of desired size.

As a new article of manufacture ammonium sulfate in the form of hard granules having a bulk density of at least 65 pounds per cubic foot, comprising a compact agglomerate of ammonium sulfate crystals of an average length in the range of 1 to 50 microns cemented together with a minimum of void space between said crystals by depositing ammonium sulfate from solution and prepared by admixing crystal magma of high solids content containing crystals of average length in the range of 1 to 50 microns with a sufficient quantity of fines devoid of large crystals to produce a product having a moisture content of not more than 1 to 10 weight per cent and removing the remaining moisture to effect said cementing of the crystals to form solid granules.

2,631,760. Fertilizer Machine. Patent issued March 17, to Lloyd G. Hoppes, Raton, N. Mex. fertilizer distributing apparatus comprising, a hopper having a plurality of longitudinally spaced openings, a partition extending across the hopper and spaced above the bottom, said partition having a plurality of longitudinally spaced openings therein in staggered relation to the openings in the bottom, a plurality of long lead upper auger screw sections longitudinally of the hopper and rotatably mounted therein above the partition, a plurality of lower relatively short

Parathion being applied on carrots

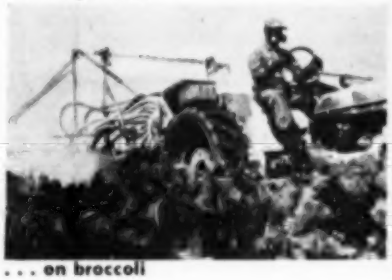


. . . on citrus

. . . on cabbage

. . . on shade tobacco

. . . on peaches



. . . on broccoli

lead auger screw sections longitudinally of the hopper and rotatably mounted therein between the bottom and partition, said lower auger sections positioned in one side of said hopper being of a reversed pitch from those on the opposite side of said hopper whereby to move the fertilizer away from the center of said hopper, the relative leads and sizes of the respective auger screw sections being such that the upper auger screw section moves the fertilizer materially faster than the lower auger screw section, spaced divider means on the lower auger screw adjacent to each of the openings to form chambers between the bottom and partition, an opening in the partition and an opening in the bottom being in each chamber intermediate adjacent divider means with one opening adjacent one end and the other opening adjacent the other end of the respective chamber for movement of fertilizer by the lower auger from the opening in the partition to the opening in the bottom for discharge therethrough, and means for rotating the upper and lower auger screws at substantially the same speed.

2,631,935. Herbicidal Compositions Containing Esters of Thiolacetic Acid. Patent issued March 17, to Luther L. Baumgartner, Hastings-on-Hudson, N. Y., assignor to the B. F. Goodrich Company, New York. The method of killing plant life which comprises uniformly depositing on the plants a lethal quantity of an ester of thiolacetic acid with a monohydric phenol.

2,631,962. Insecticidal Composition Comprising a Glycol and an Insecticidal Phosphate. Patent issued March 17, to Joseph B. Moore, Edina, Minn., assignor to McLaughlin Gormley King Co., Minneapolis, Minn. A water miscible spray insecticidal composition comprising an alkylene glycol containing from 2 to 6 carbon atoms and an insecticidal phosphate material selected from the group consisting of tetraethylpyrophosphate, and diethyl-p-nitrophenyl thiophosphate.

2,632,698. Plant Growth Regulant Compositions Containing Haloaryl Sulfinic and Thiosulfinic Acids or their Salts. Patent issued March 24, to William D. Stewart, Brecksville, Ohio, assignor The B. F. Goodrich Co., New York. The method of altering the growth characteristics of a plant which comprises applying to at least some of the cells of the plant structure, in a quantity sufficient to alter the growth characteristic of the plant, a composition containing as the essential active ingredient 0.01% to 10% by weight of a compound having the formula

$$Y—S(=O)—AB$$

where Y is a haloaryl group, A is a member selected from the class consisting of oxygen and sulfur, and B is a member selected from the class consisting of hydrogen and a cation of a strong base.

2,633,412. Apparatus for Making Organic Fertilizer. Patent issued March 31, to Karl Folke, Eweson, N. Y. Apparatus for making organic fertilizer, comprising, a tank, a grid extending across the interior of said tank, said grid comprising a plurality of spaced, parallel, flexible strands, each of said strands having one end anchored to the tank wall and another end secured to a member mounted for movement relative to the tank wall, and means for adjusting the position of said movable member to slacken said strands and to stretch them taut.

2,633,413. Apparatus for Making Organic Fertilizer. Patent issued March 31, to Karl Folke, Eweson, N. Y. Apparatus for making organic fertilizer, comprising, a tank, a grid extending across the interior of said tank, said grid comprising a plurality of spaced flexible strands, each of said strands having one end anchored to the tank wall and another end secured to a rotatable member substantially axially thereof, and means to rotate said member to twist and untwist said strand to stretch it taut and to slack it off.

Trade Mark Applications

Condition-All, in stencil capital letters, for aggregate for fertilizer in the nature of granular expanded volcanic rock. Filed Aug. 21, 1952, by Indoken Perlite Co., St. Bernard, Ohio. Claims use since Apr. 1, 1952.

Granuflo, in capital letters, for fertilizers. Filed Sept. 11, 1952, by Summers Fertilizer Company, Inc., Baltimore, Md. Claims use since February 20, 1951.

Loamex, in capital letters, for soil conditioning material. Filed Apr. 11, 1952, by The Reardon Company, St. Louis County, Mo. Claims use since on or about Feb. 1, 1952.

Agrilon, in capital letters, for synthetic poly-electrolytes used as soil conditioning agents. Filed June 5, 1952, by American Polymer Corporation, Peabody, Mass. Claims use since May 20, 1952.

Austin's Very Best, with the first word in a semi-circle over the other two and the letter "Y" exaggerated, for commercial fertilizer. Filed July 29, 1952, by Guy D. Austin, Miami, Florida. Claims use since August, 1946.

Aco-Co, in capital letters, for fertilizer. Filed Sept. 8, 1952, by Southern Cotton Oil Co., New Orleans, La. Claims use since May, 1912.

Niagarathal, in gothic capital letters, for cotton defoliant, nursery defoliant and selective herbicide. Filed Oct. 10, 1951, by Food Machinery & Chemical Corporation, San Jose, Calif. Claims use since March 15, 1951.

Palmetto, in heavy capital letters, for sulfur in powder form used for agricultural dusting. Filed Mar. 26, 1949, by Mathieson Chemical Corporation, New York, assignee of Southern Acid & Sulphur Co., Inc. Claims use since June, 1925.

Triogen, in capitals and lower case, set on a slant, for fungicides, insecticides and disinfectants for plants, seeds, seed pods, fruits, nuts and tubers. Filed July 8, 1952, by Rose Manufacturing Co., Beacon, N. Y. Claims use since July 11, 1932; and since October, 1944 in the form shown in present application.

Armour, in capital letters within shield, for glue and an adhesive agent for use with insecticides and fungicides. Filed May 21, 1951 by Armour & Co., Chicago, Ill. Claims use since Apr. 14, 1950.

Drawing of dwelling with tall trees at each side, for herbicides, insecticides and fungicides. Filed Oct. 8, 1952, by Swift & Co., Chicago, Ill. Claims use since April, 1946.

Nitrox, in spaced-out capital letters, for insecticides. Filed Sept. 29, 1952, by Chemagro Corporation, New York. Claims use since July 11, 1952.

Kilgore's Plant-O-Cide, the first word above, and the remainder at an angle. For insecticide and fungicide. Filed Feb. 9, 1952, by Kilgore Seed Co., Plant City, Fla. Claims use since April, 1949 in this way, and since 1920 on the word "Kilgore's".

Drawing of insect with drill on nose, boring through a pod, for insecticides. Filed Sept. 12, 1952 by National Distillers Products Corp., New York. Claims use since June 25, 1952.

Fertilene, in hand-drawn letters, superimposed over circle and placed between drawings of plant stems, for liquid fertilizer. Filed May 23, 1952, by Edwin J. Frank, Worthington, Ohio. Claims use since Aug. 25, 1950.

Ferro-Sene, in stencil capital letters, for agricultural fertilizer. Filed Aug. 15, 1952, by Bersworth Chemical Co., Framingham, Mass. Claims use since July 3, 1952.

Vent-A-Soil, in Roman capital letters, for soil conditioner. Filed June 17, 1952, by Perma-Rock Products, Inc., Baltimore, Md. Claims use since May 14, 1952.

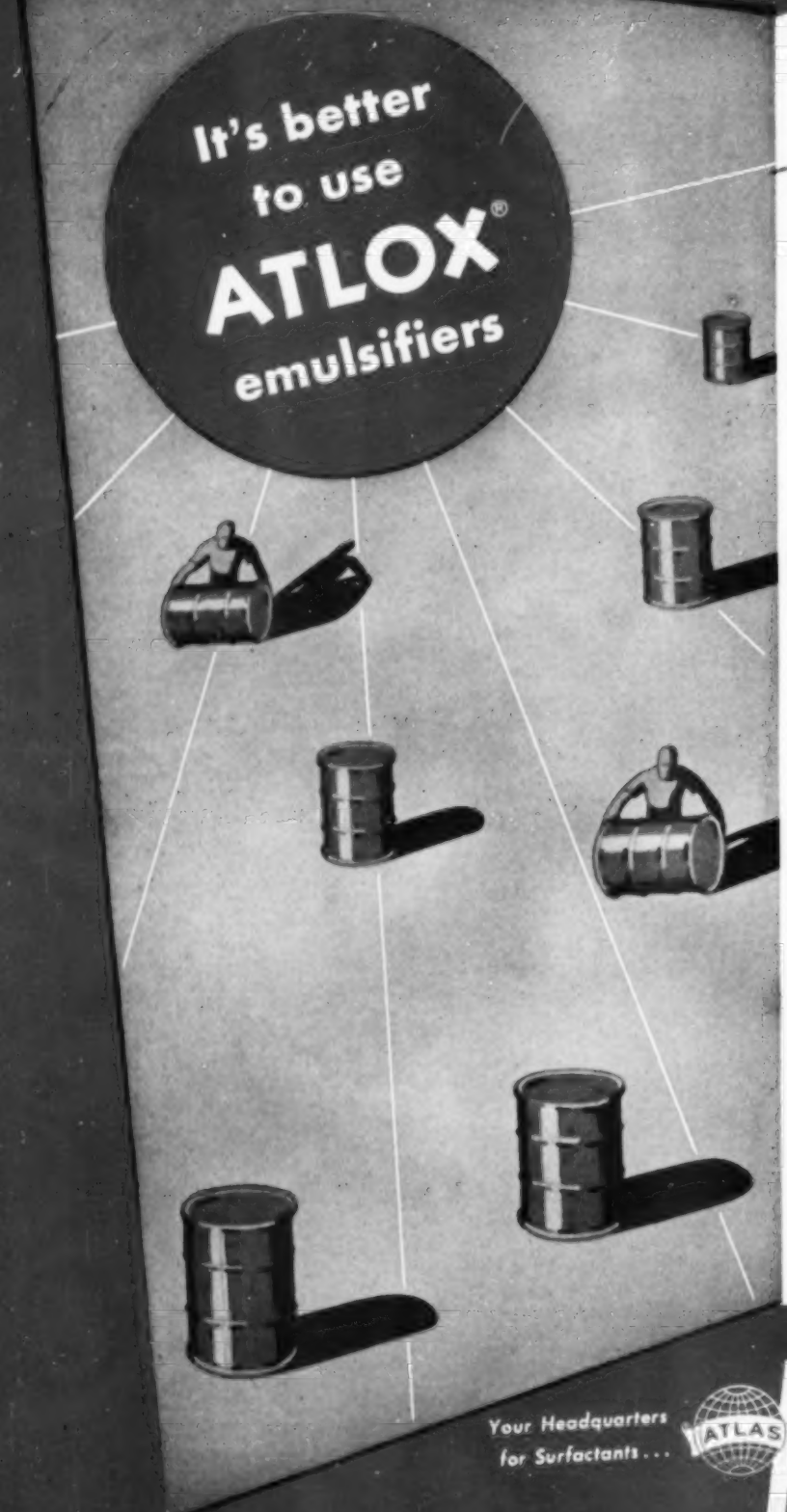
A Green Line Product, in capital letters with a line drawn horizontally through it, for fertilizers. Filed June 5, 1951, by Eastern States Soilbuilders, Inc., Sharpsburg, Md. Claims use since Jan. 1, 1951.

Drawing of dwelling with tall trees at each end, for plant food. Filed Nov. 20, 1951, by Swift & Co., Chicago, Ill. Claims use since about 1939.

Gro-All, enclosed within an elongated diamond-shaped box, for fertilizer compounds. Filed Dec. 28, 1951, by Central Chemical Corp., Hagerstown, Md. Claims use since Dec. 29, 1919.

Loamaker, in sans serif capital letters, for synthetic resinous polyelectrolyte soil conditioning agent. Filed Feb. 18, 1953, by Monsanto Chemical Co., St. Louis, Mo. Claims use since Dec. 13, 1951.

Wooster Plant Bilder, in hand-lettered type within a box in which appear cartoon characters, for soil fertilizers. Filed May 10, 1950 and supplemental register, May 1, 1952, by Heeman Manufacturing Co., Wooster, Ohio. Claims use since Apr. 24, 1950.



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Fertilizer Conference Set for Clemson

PROGRAM plans are complete for the eleventh annual convention of the Association of Southern Feed and Fertilizer Control Officials, to be at the Clemson House, Clemson, S. C., June 22 and 23.

Dr. R. F. Poole, president, Clemson Agricultural College, will address the group in first afternoon session and J. J. Taylor, Florida State Chemist, Tallahassee and president of the Association, will present his presidential address. He will be followed by Dr. Webster Pendergrass, University of Tennessee, Knoxville, on "Public Relations."

Other topics slated for discussion at the opening session include "New Uses of Insecticides in Fertilizer and Soil Toxicity Studies," by Dr. M. D. Farrar, South Carolina Agricultural Experiment Station, Clemson. N. R. Page, also of the S. C. Experiment Station, will discuss "Minor Elements, Availability and Residual Effects" to complete the afternoon's session.

The annual banquet, held Monday evening, June 22, will feature two speakers and the presentation of a film, "South Carolina." Bruch D. Cloaninger, Clemson, S. C., will be toastmaster to introduce the speakers, D. W. Watkins, director of the S. C. Experiment Station; and J. A. Rogers, Coker's Seed Co., Hartsville, S. C.

A new film, "Cash In On Corn," produced by the National Fertilizer Association, will open the meeting on June 23, preceding two speakers and a panel discussion. Speakers will be T. C. Law, Atlanta, Ga., on "Chemical Control in Industry"; and G. W. Brandt, Clemson, "The Relation of Nutrition to Fertility in Dairy Cattle." The panel discussion will cover "What Population Can Be Fed Adequately by American Farms?" Participating will be Dr. H. P. Cooper, dean and director, Clemson; Dr. E. J. Lease, nutritionist; and Dr. G. H. Aull, head, Clemson Department of Agricultural Economics.

Officers of the Association, in addition to president Taylor, are: Parks A. Yeats, Oklahoma City, Okla., vice-president; and Bruce Poundstone, Lexington, Ky., secretary-treasurer.

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FMC Names Farley to Post

Food Machinery & Chemical Corporation, New York, has announced the appointment of Franklin Farley as management consultant to its Chemical Division's Administrative Staff. His headquarters will be in the FMC offices in the Chrysler Building, East, New York.

Mr. Farley, a graduate of the University of Kansas, has been associated in the past with Arthur D. Little, Inc., Cambridge, Mass.; and International Minerals & Chemical Corp., Chicago, Illinois.

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St. Regis Names Lozier

KENNETH D. LOZIER

Kenneth D. Lozier was named a vice-president of St. Regis Paper Company at a recent meeting of the firm's board of directors. Mr. Lozier, whose responsibilities include advertising and sales promotion for all divisions of the company, joned St. Regis thirteen years ago.

At the same board meeting, B. W. Recknagel was elected as an assistant secretary.

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Midwest Plant for Niagara

Niagara Chemical Division, Food Machinery and Chemical Corporation, has purchased property at Wyoming, Illinois, to establish midwestern facilities for the production of agricultural chemicals. The property, formerly known as the Government Hemp Plant, consists of 46 acres of land containing buildings with 32,000 square feet of floor space.

Jackson V. Vernon, FMC vice-president and head of the Niagara Chemical Division, Middleport, New York, stated that the Wyoming, Illinois, facilities are being established to serve the midwestern farmers' requirements for essential agricultural chemicals. Mr. Vernon said that the rehabilitation of buildings and the installation of special chemical production equipment is proceeding under the direction of Kervis Williams, local plant superintendent of the Niagara project. Mr. Vernon further stated that the new Niagara facilities will operate as a production unit only and that Niagara's sales program will continue under present plans which have been in effect throughout the midwest for many years.

The Niagara Chemical Division plant at Wyoming, Illinois, is the 14th production unit in the division's system of manufacturing operations located throughout the United States, Canada, and Mexico.

•

Wetting Agents' Use Explained

Frequently-asked questions on the use of wetting agents in fertilizer to speed reaction and improve the ultimate texture, are answered in a booklet just published by Monsanto Chemical Company's Phosphate Division.

It is pointed out that the addition of one pound of "Santomerse No. 1 Spray Dried" per ton of fertilizer permits desired reactions to take place in optimum time without the addition of excess water. The new technique, is particularly valuable in the processing of higher analysis goods.

In addition to speeding reactions, use of "Santomerse No. 1,"

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Fulton's W.P.P.L. (Waterproof Paper Lined) **Bags** provide built in protection for your product. An inner lining of tough crinkled Kraft paper, or plastic, is laminated with special adhesives to cotton or burlap...safely...surely...sealing in your product against the damaging effects of moisture, odors, or other outside influences. Many manufacturers have found that **Fulton W.P.P.L. Bags** give them *all* the advantages of more expensive rigid containers, with the economy and other savings of an easy-to-handle textile bag. For full details, write your nearest Fulton factory today!

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an alkyl aryl sulfonate, has demonstrated ability to produce better flowability and texture, insure against setting up in bags or storage, and is a proven economy in operation, the company states. Copies of the booklet may be obtained from Phosphate Division, Monsanto Chemical Company, St. Louis 4, Missouri.

•

Joins Stauffer Chemical Co.

ARCHIE E. ALBRIGHT, JR.

Stauffer Chemical Company has announced the appointment of Archie E. Albright, Jr. as assistant to the company's executive vice-president, Hans Stauffer. Mr. Albright was formerly associated with the law firm of Patterson, Belknap and Webb in New York City.

•

N. J. Station Names Carnes

Agustus E. Carnes has been appointed assistant information specialist on the staff of the N. J. Agricultural Experiment Station, New Brunswick, N. J.

•

Ohio Plans Pesticide Tour

The annual tour of the Ohio Pesticide Institute will be held on August 12, 13, and 14, 1953. The tour will originate on the grounds of the Ohio Agricultural Experiment Station at Wooster on the 12th and will end at the Northwest Test Farm at Hoytville on the 14th.

Vegetable and fruit plots treated with numerous pesticide formulations applied with various forms of applicators will be available for inspection, according to Dr. J. D. Wilson, Ohio Agricultural Experiment Station, Wooster, secretary of the Ohio Pesticide Institute.

New Wilson Soil Conditioner

Wilson Organic Chemicals, Inc., manufacturers of "Poly-Ack," synthetic liquid resin soil conditioner, have announced the commercial production of a new formulation called "Poly-Ack #15." According to James A. Wilson, director of sales, the new product was developed especially for use on agricultural acreage. For as little as $5.00 per acre, "Poly-Ack #15" is said to control soil crusting and hard-panning. Moisture and fertilizer penetration is increased and seedling emergence improved, the makers state.

The new material is an out growth of Wilson's liquid soil conditioner supplied in 4 fluid ounce bottles and 1-gallon cans for use by home gardeners, etc., with from 32 to 1,000 sq. ft. to condition. The new product is expected to appeal to large scale farmers.

the abc's of the ST. GOBAIN PROCESS FOR THE MANUFACTURE OF GRANULATED COMPLETE FERTILIZERS

advantages

The St. Gobain process manufactures complete Nitrophosphate granulated fertilizers in one continuous automatic operation. Its extreme flexibility permits the production of various nitrogen-phosphorous-potash formulae without altering the equipment.

benefits

You benefit from the improvements made during the ten years of successful industrial operation. The St. Gobain system reduces the sulphuric acid consumption by replacing it with nitric acid. No phosphate rock grinding is necessary.

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Investment and operating costs are low due to simple equipment, continuous operation, and to a very high yield.

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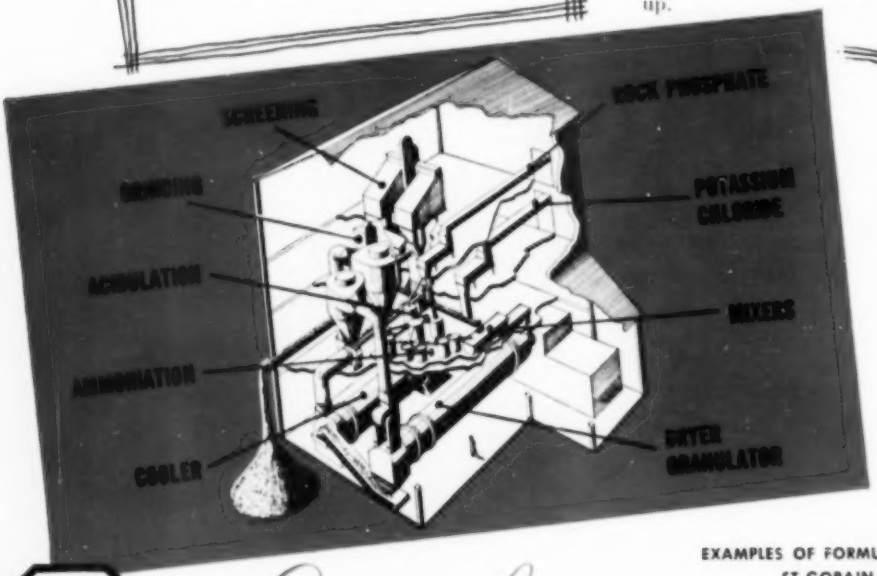

For further information write to

General INDUSTRIAL DEVELOPMENT CORPORATION

270 PARK AVENUE, NEW YORK 17, N. Y.

EXAMPLES OF FORMULAE PRODUCED BY ST-GOBAIN PROCESS

N%	P.O.%	K.O%	
10	10	17	(sulfo-nitric acidulation)
11	11	11	" " "
10	15	20	(phospho-nitric acidulation)
12	15	18	" " "
12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

AGENTS FOR ST-GOBAIN PROCESS

Grace Chemical Names Parks

DR. ROBERT Q. PARKS

Dr. Robert Q. Parks, nationally known agronomist, has been named manager of agricultural services of the Grace Chemical Company. He has been in charge of research in soil managtment and fertilizer use for the U. S. Department of Agriculture

(Grace Chemical Company, a wholly-owned subsidiary of W. R. Grace & Co., is constructing a nineteen-million-dollar nitrogen plant near Memphis, Tennessee, as reported in April AGRICULTURAL CHEMICALS)

Well known in the agricultural field, Dr. Parks has been associated with the Ohio Agricultural Experiment Station at Wooster; the U. S. Plant, Soil, and Nutrition Laboratory at Ithaca, N. Y.; and the U. S. Department of Agriculture Experiment Stations at Auburn (Alabama) and Beltsville, Maryland.

He received his B. S. and M. S. degrees from the University of Arizona and his Ph. D. degree from Ohio State University in 1941.

•

Fertilizer Grades Discussed

Dr. J. F. Fudge, State Chemist of Texas, has announced that the annual public hearing concerning grades of fertilizers to be recommended for sale in the states of Louisiana, Arkansas, New Mexico and Texas during next year, will be held at the Buccaneer Hotel, Galveston, Texas, on July 10.

•

Forest Pests Under Control

Cooperation of entomologists, foresters and private land owners is bringing under control outbreaks of Southern pine beetle in Southwestern Mississippi, it is reported. Surveys and control activities will be continued in the infested area until the outbreak has been controlled, according to forest entomologists of the U. S. Department of Agriculture.

Chemical spraying of unmerchantable logs, combined with prompt salvage and conversion to lumber of infested timber, has been mainly responsible for effecting a striking reduction of the outbreak since accumulations of infested timber are a source of feed for the beetles. By autumn of 1952, nearly 9 million board feet of timber had been salvaged from southern Mississippi National Forest holdings alone, the entomologists said, and more than 4½ million board feet equivalent of pulpwood had been sold.

Another serious insect pest of southeastern forests, the black turpentine beetle, did considerable damage to trees in limited areas of Florida forests in 1952. Heavy populations of the pest have caused serious damage in parts of the Osceola National Forest. A survey in six counties in northeast Florida showed the infestations of this beetle, although heavy in localized areas, were diminishing.

Joins Florida Ag. Firm

CHARLES E. BRIAN

Appointment of Charles E. Brian as assistant sales manager, Florida Agricultural Supply Company, a division of the Wilson & Toomer Fertilizer Company, Jacksonville, Florida, has been announced by M. C. Van Horn, vice-president of Wilson & Toomer.

A native of St. Francisville, Illinois, Mr. Brian was graduated from St. Francisville high school, obtained his B. E. degree at Eastern Illinois State Teachers College and his M. S. degree at the State University of Iowa. He spent an additional two years working toward his doctorate at Ohio State University, Columbus, Ohio, but this was interrupted by World War II when he served three years with the United States Navy from which he emerged with the rank of lieutenant.

For nearly 12 years, the new assistant sales manager was affiliated with a national manufacturer and distributor of pesticides, part of which time he specialized in field research and sales service in Florida and the Southeast.

•

Naco Insecticide Div. Intact

A recent news story in *Agricultural Chemicals*, in referring to the fact that Naco Fertilizer Company had discontinued its insecticide division at Charleston, S. C., led a number of readers to conclude that Naco had abandoned its insecticide division entirely. According to Philip Wallach, Naco Public Relations department, New York, "This is by no means the case."

"I should like to re-emphasize the fact that Naco continues to manufacture and distribute a complete line of insecticides from its plants and farm supply stores located throughout the Carolinas, Florida and in Ohio," Mr. Wallach writes. "The only change consisted of a personnel realignment, with the transfer of certain duties from Charleston to the central office in New York."

•

FTC Cites Fertilizer Ads

Garden Research Laboratories, Madison, N. J. and Huber Hoge & Sons, Inc., New York, have been cited by the Federal Trade Commission on the grounds that the former's product, "RX-15", a liquid fertilizer, had been misrepresented in advertising prepared by the Hoge firm, an advertising agency. The fertilizer had been termed a "super-powerful" plant food for flower and vegetable gardens.

FTC charges that contrary to advertising claims, the product alone will not cause an abundance of vegetables and flowers to grow; it is not more effective than many other fertilizers; it is not substantially cheaper than many other fertilizers and it can injure plants if used excessively.

The Commission pointed out that "such false representations . . .

constitute unfair methods of competition and unfair and deceptive acts and practices in commerce within the intent and meaning of the Federal Trade Commission Act." The first hearing will be held in New York on June 10.

•

Mullison to Dow Export Post

DR. WENDELL R. MULLISON

Appointment of Dr. Wendell R. Mullison as assistant technical director of Dow Chemical International Limited and Dow Chemical Inter-American Limited has been announced by Clayton S. Shoemaker, president of both Dow export subsidiaries.

Dr. Mullison, who served the past seven years as a plant physiologist with Dow's Agricultural Chemical Research Department in Midland, will be associated with Dr. Frank B. Smith, technical director of the two export companies. He will be particularly active in technical service and development work connected with the sale of Dow agricultural chemicals abroad.

He holds several patents in the herbicide field and has authored a number of papers on plant nutrition, plant hormones and weed killers. Prior to joining Dow in 1946, he was associated with the biology department of Purdue University and later served as a plant physiologist with the Dutch firm, Curacaosche Petroleum Industrie Mij., on Curacao Island, off the coast of Venezuela.

Dr. Mullison received his B.A. degree from the University of New Mexico and his Ph.D from the University of Chicago.

Toxaphene Record is Set

Hercules Powder Company, Wilmington, Del., has announced that a new high total of official State and Federal recommendations for toxaphene have been made. The total of 150 includes recommendations by more than 40 individual states as well as from the U. S. Department of Agriculture.

Although a substantial increase has been noted in the variety of pests for which toxaphene is recommended, the largest single market continues to be for control of cotton insect pests, Hercules states.

•

Wyandotte Adds Lindane

Wyandotte Chemicals Corp., Wyandotte, Mich., has announced that it has added lindane to its line of products. According to Charles F. Gerlach, manager of the Wyandotte agricultural chemicals department, the material is presently available from conveniently located warehouses serving both domestic and export

DDT

means NEW BUSINESS

Wide application is the key to profitable promotion of *Santobane* (Monsanto DDT). This versatile compound is effective against a large number of insects.

Look over the uses listed here. Chances are several of them will apply to your area—and may suggest new business opportunities for you.

Dutch Elm Disease and elm phloem necrosis are the most destructive diseases of elm trees in the U. S. Spraying with a 1% DDT emulsion or oil solution at three intervals will control both diseases: before leaves appear, again when leaves are full-grown, and a third time about mid-August.

Mothproofing with EQ-53. USDA's new formula, containing 30% DDT by weight, is being pushed with strong educational campaigns directed at the housewife. EQ-53 is effective in treating washable woolens against clothes moths and carpet beetles.

The largest aerial spraying job in history was recently organized by pulp and paper companies to spray a million acres of balsam fir in Canadian forests. More than a million gallons of DDT formulation were used here to kill spruce budworm.

DDT in Sardinia. In a successful drive conducted over the past four years, American technological leadership spearheaded the battle to rid Sardinia of mosquitoes. Draining and spraying 1,300,000 possible breeding places on this rocky Mediterranean island resulted in a drop in malaria cases from 75,447 in 1946 to only nine in 1951.

Use *Santobane* to control:

BOLL WEEVIL
CORN-EAR WORM
COTTON FLEA HOPPER
LYGUS BUGS
PINK BOLLWORM
COLORADO POTATO BEETLE
POTATO LEAF HOPPER
CABBAGE WORM
APPLE LEAF HOPPER
CODLING MOTH
ROSE CHAFER
JAPANESE BEETLE
PEACH-TREE BORER
ORIENTAL FRUIT MOTH
GYPSY MOTH
CANKERWORM
POULTRY LICE
HOUSEFLY
MOSQUITO
...AND OTHER INSECTS

Santobane: Reg. U. S. Pat. Off.

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CHEMICALS—PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

ARE YOU GETTING YOUR SHARE?

Write for 24-page booklet "Formulating *Santobane*." It will help increase your sales of DDT. Monsanto Chemical Company, Organic Chemicals Division, 800 North Twelfth Blvd., St. Louis 1, Missouri.

markets. Mr. Gerlach states that further information is available by writing the company, Dept. ACS, Wyandotte, Mich.

•

Neb. Plant Under Construction

General Fertilizer Company has started construction on a new fertilizer plant at Fremont, Nebraska.

W. A. KOEPPLIN

When completed about July 1, the plant will have an annual capacity of some 20,000 tons, according to B. T. Christensen, sales director for the company.

The plant will produce various grades of mixed fertilizers including 15-15-0; 10-20-0; 8-32-0 and the products will be sold to established dealers located in Nebraska, South Dakota and Iowa.

Officers of the new company are: W. A. Koepplin, president; Stewart Daniels, plant manager; Victor Keilstrup, secretary-treasurer. Product sales will be directed by Mr. Christensen.

•

California Meeting May 13

Modern trends in the use of systemic insecticides, and other agricultural topics were on the agenda for discussion at the May 13th meeting of the Central California Agricultural Forum. The meeting was to be held in the Palm Room of the Bakersfield Inn.

Advance plans called for Dr. R. L. Metcalf, chairman of the Department of Entomology at the University of California Citrus Experiment Station, to moderate a discussion on the "Use of Systemic Insecticides in Agriculture," with Dr. Hal Reynolds and Dr. Lee Jeppson also appearing. Several phases of the field, including the use of systemics on vegetable, field and tree fruit crops, were to be covered, as well as some of the more basic considerations such as the history, toxicology, biochemistry and residue analysis.

Dr. P. H. McGauhey, assistant director of the University of California Field Station at Richmond was to discuss various means by which agricultural wastes may be utilized.

Dr. James C. Martin, University of California Department of Plant Nutrition was to discuss irrigation water quality and its effect on the agriculture in the central part of California.

Asher to Spencer Sales

C. R. "BOB" ASHER

C. R. "Bob" Asher, Monticello, Ill., has been added to the agricultural sales division of Spencer Chemical Company. He is Illinois sales representative for Spencer, replacing Francis E. Best, who is now Missouri sales representative. Mr. Asher previously was with E. H. Sargent & Co. A graduate of Michigan State college, Mr. Asher majored in bacteriology and chemistry.

•

Horsfall Wins High Honor

Dr. James G. Horsfall, director, Connecticut Agricultural Experiment Station, New Haven, has been elected to the National Academy of Sciences.

Nationally known for his work in plant pathology, he has developed a number of new fungicides for control of plant diseases and has pioneered in the use of chemotherapy. His book, "Fungicides and Their Action", published in 1945, has become a classic.

Dr. Horsfall has received numerous honors previously, having been president of the American Phytopathological Society in 1951. He was made director of the Connecticut station in 1948.

•

Correction is Noted

A news story in our April issue stated that Allen R. Greenlaw had been made general sales manager of Sharples Chemical Co., Philadelphia. However, according to Charles D. Karlsruher, manager of the firm's public relations department, this is a mistake. The sales manager is George R. Lawson, it is pointed out. *Agricultural Chemicals* regrets this error.

AS WE GO TO PRESS . . .

Mathieson Acquires John Powell & Co.

MATHIESON Chemical Corp. has completed negotiations which will lead to the acquisition of John Powell & Co., Inc., its subsidiaries and associated companies, according to a joint announcement made May first by Thomas S. Nichols, president of Mathieson, and H. Alvin Smith, president and treasurer of Powell.

John Powell & Co., Inc., founded in 1923, has been a leader in the development and formulation of insecticides, herbicides and rodenticides. Four basic grinding and mixing plants to serve pesticide formulators are operated at Brooklyn, New York; Atlanta, Georgia; East Omaha, Nebraska; and Elkton, Maryland. Sales offices are located throughout the United States and a technical service laboratory is maintained at Port Jefferson, Long Island, to render assistance and formulating data to Powell's customers.

Mathieson has for the past several years been manufacturing basic chemicals for insecticide and herbicide use. The integration of Powell's broad distribution system into Mathieson's agricultural chemicals business will make it possible further to expand Mathieson's operations throughout the United States and foreign countries.

The management of Powell will continue as a part of the Mathieson organization, and the present policy of service and assistance to Powell's customers will be continued and strengthened by this merger.

Mathieson Chemical Corporation, with headquarters in Baltimore, Maryland, is one of the country's major producers of industrial and agricultural chemicals,—organic and inorganic.

Mathieson's production for the agricultural chemical trade includes chlorine and chlorinated products, nitrogen products, sulphur and sulphuric acid, fertilizers and insecticides, and hydrocarbon products. It also produces Squibb drug and pharmaceutical products, dry ice, carbonic gas, alkalies and hydrazine.

Mathieson has total assets of more than $320-million, production of millions of tons of basic chemicals annually, 20 U. S. manufacturing plants and 17 foreign plants and licensees distributing throughout the free world.

•

Fall Meeting Dates Set

Meeting dates have been set for the sixth annual Pesticide Application Equipment Conference and fifteenth annual New York State Insecticide and Fungicide Conference, according to Dr. Charles E. Palm, Head, Department of Entomology, Cornell University, Ithaca, N. Y.

The joint meetings will be held November 10-12 at Bibbins Hall, G.L.F. Exchange, Ithaca, where these sessions have been held previously.

Meeting plans are being worked out by a committee, and announcements will be made later.

•

3 Safety Meetings in May

Three separate state fertilizer safety meetings were scheduled for May. On May 8, sessions were to be held at Baltimore, Md. and at Roanoke, Va. for the states of Maryland and Virginia, respectively.

On May 14, the North Carolina Fertilizer Safety Conference was to be held at Winston-Salem. Full reports of these meetings will be included in our June issue.

•

Smith-Douglass Elects V-P

WILLARD R. ASHBURN

Smith-Douglass Co., Inc., Norfolk, Va., has named Willard R. Ashburn vice-president of the firm. The announcement was made by Ralph B. Douglass, president.

Mr. Ashburn has been general counsel of the corporation since 1936 and a director since 1950. He is senior partner of the law firm of Ashburn, Agelasto & Sellers, Norfolk.

•

Pacific Branch, ESA, to Meet

The Pacific Branch of the Entomological Society of America will hold its annual meeting at Connolly's Hotel, Lake Tahoe, California, June 23-25. According to Dr. Ray F. Smith, Univ. of California, Berkeley, program chairman, invitational papers, symposia and panel discussions will be presented.

•

New Division For Ferro

A new agricultural division has been created by the Ferro Corporation, Cleveland, Ohio, the firm has announced. The new division, organized to handle development and marketing of its new product, "FTE," (Fritted Trace Elements) will be headed by Gene L. Bruton, director, and E. I. Walters, manager. The appointments were made by C. D. Clawson, president of the corporation.

The product was developed by Ferro during a five year program of research and experimentation. It

contains mineral trace elements, including manganese, iron, zinc, copper, boron and molybdenum which are released slowly in the soil.

Mr. Bruton has been associated with the Ferro Corporation since 1936 when he joined the company as a sales and service engineer. In 1948 he was made assistant general sales

GENE L. BRUTON

manager and in 1949 became sales manager. He is a native of Princeton, Ill. and holds a B.S. degree from the University of Illinois.

Mr. Walters joined Ferro in 1945 as a field engineer for the Allied Engineering Division. When the Agricultural Frit Department was formed in 1952, he was made its sales manager. He is a graduate of the General Motors Institute.

Advantages of using "FTE" are highlighted by its ability to remain in the soil for at least a full season after one application, according to the makers. A slowly-soluble material, it is also said to be non-toxic and will not harm plant roots either by itself nor in combination with other elements in the soil.

Sales of FTE to major element manufacturers will be handled directly by the Ferro Corporation, while the marketing of the product to home gardeners and small growers will be through E. I. duPont de Nemours & Co., Inc.

•

Tomasek to Pittsburgh Ag.

H. F. Tomasek has been made sales manager of the Pittsburgh Agricultural Chemical Division of Pittsburgh Coke & Chemical Co., the company has announced. Mr. Tomasek joined the division in 1948 and has most recently been field sales manager with headquarters in St. Louis, Mo. His new offices will be in the Empire State Building, New York.

•

"Pesticopoeia" Now Available

The new "Pesticopoeia", containing summarized data on pesticide chemicals, has been published by the Association of Economic Poisons Control Officials. Data on more than a hundred pesticide chemicals are included, according to Dr. J. L. St. John, State College of Washington, who has been in charge of the compilation. Formulations are not covered, he says.

"The data are more diverse than in compilations for other uses and include chemical and physical properties, analytical methods, toxicity, first aid and antidotes, use precautions, types of usefulness and other related information", Dr. St. John says.

The material was accumulated by special investigators and reviewed by scientists in regulatory and research work in government and industry. Definitions of terms, legal information and regulatory principles are outlined.

The "Pesticopoeia" is available from A. B. Heagy, Box HH, University of Maryland, College Park, Md. The price is $3.

■

Berry To Delaware Post

ROBERT C. BERRY

Robert C. Berry has been appointed entomologist-salesman for the Newton Chemical & Supply Company, Bridgeville, Delaware. Mr. Berry was entomologist for the S. B. Penick & Company, New York during the past six years.

In his new position, Mr. Berry will assist Jack Doordan.

NPA Prepares "Time Table" of New Nitrogen Production

How fast will solid nitrogen be available as a result of the government-sponsored expansion program, now well under way? This question is answered in a compilation by the National Fertilizer Association which presents a time table of estimated production for new Defense Production Administration-certified plants. It is pointed out that the table represents production only from those plants covered by DPA certificates.

SOLID NITROGEN PRODUCTION
ESTIMATED PRODUCTION FROM DPA CERTIFIED PLANTS
Thousand Tons of N

	First Half 1953	Second Half 1953	First Half 1954	Second Half 1954	1955	Total Tonnage Certified	Increases by USDA in 1951
Ammonium Nitrate	[1]	21	38	86	222	222	160
Ammonium Sulfate	[1]	15	22	31	90	90	110
Urea				56	197	217	175
Ammonium Phosphate and Nitraphosphate	[1]	23	36	50	202	202	240
Total	32	59	96	223	711	731	685

[1] Quantities are not listed in order to prevent disclosure of individual company operations.

Spencer Ups J. W. Jones

J. W. "Bill" Jones has recently been promoted by Spencer Chemical Co. to technical service representative in the Mid-South, and is working out of the Memphis office. He had worked for a year in the technical service section in Kansas City, Mo. A native of Kansas City, Mr. Jones was graduated from Rockhurst college there in 1950, with a B.S. degree in chemistry. He joined Spencer in July, 1951.

•

Highway Equip. Names Ad Men

WILLIAM W. KINGMAN

The appointment of William W. Kingman as general sales and advertising manager for Highway Equipment Company of Cedar Rapids, Iowa, has been announced by Roy C. Gaddis, president.

Mr. Kingman brings to Highway Equipment a number of years' experience in the construction equipment business and has most recently been Chicago branch manager for Illinois Contractors' Machinery, Inc. Prior to that he had been sales manager for the manufacturing division of the Maxon Construction Company, Inc., Dayton, Ohio.

Highway Equipment Company manufactures a complete line of spreaders and bulk delivery equipment which is sold by distributors throughout the United States, Canada and abroad.

•

Beg Pardon - - -

The report of the North Central Branch meeting of the E.S.A. in St. Louis, appearing on pages 42-44 of the April issue of AGRICULTURAL CHEMICALS indicated that studies of "Rhothane" were presented by E. M. Swisher, Rohm & Haas Co., Kansas City. The product under discussion was of course, not "Rhothane," but rather the new Rohm & Haas contact stomach poison "Perthane," formerly designated as Q-137. According to Mr. Swisher, it is expected that "Perthane" will sell for about ⅔ the current price of methoxychlor, rather than ⅓ as indicated in our article.

Another error in our meeting report has also been called to our attention. It was H. M. Harris of Iowa State College who was elected to the governing board of the North Central Branch, ESA, not H. H. Harris of McConnon & Co., Winona, Minn., as we indicated. We apologize for this case of mistaken identity. It is not the first time, we are told, that the two men have had their names confused.

In a photo caption, page 105, April AGRICULTURAL CHEMICALS, the name of Rose Manufacturing Company, Beacon, N. Y., was omitted in connection with the African violet kit pictured. We are sorry that Rose Manufacturing was not identified as the marketer of the new product.

•

USDA Combines Pest Studies

Control of all insects affecting corn production, rather than only the European corn borer and the corn earworm, is to be emphasized by the U. S. Department of Agriculture, it was announced in April. Stations for studying the different corn insects will be located in at least seven states, and the research will dovetail with similar research by the states and other agencies, the U.S.D.A. says.

Some four months' review by the U.S.D.A. Bureau of Entomology and Plant Quarantine lay back of the realignment. Consultations have been held with state experiment station personnel in 30 corngrowing states, resulting in a program which will place more emphasis on research concerned with controlling soil insects of corn, the Southwestern corn borer and other less well-known corn pests.

In the Department's new program, headquarters for research on the European corn borer will continue to be at Ankeny, Iowa, with sub-stations at Toledo, Ohio, and Moorestown, N. J. The corn earworm, and soil insects, will be studied intensively at an Urbana, Ill., research station.

Plant resistance to corn earworm in sweet corn and popcorn is the chief research problem at the Lafayette, Ind. station. At a newly-established station at Stillwater, Okla., the corn insects most destructive in the Oklahoma, Kansas, Arkansas and Texas area, particularly the Southwestern corn borer and certain soil insects, will get major emphasis. At another station at State College, Miss., entomologists will continue work on corn insect problems.

•

Riedeburg Operations Expand

Theodore Riedeburg Associates have announced the expansion of their offices and the addition of Mr. I. "Rusty" Furstenburg to handle export sales of agricultural and industrial chemicals. Mr. Furstenburg is a graduate engineer from the University of California and has just returned from Paris where he spent the past year developing markets for Riedeburg Associates lines. The Riedeburg offices are now located in room 306, Central Terminal Building, 415 Lexington Ave., New York 17.

Pesticide Market Survey Optimistic

This article, beginning on page 30, was intended for use only in the main section of the magazine. However, additional replies to our questionnaire contained information too important to keep from our readers. — Ed.

REITERATING in general the views expressed by tradesmen in other parts of the country, a representative of a Virginia manufacturing firm stated that if the industry prepares for a normal year, it could turn out to be a profitable season. However, he was not too optimistic about the trade's catching on in time.

"With an insect carryover of about 78%, the highest in 17 years with exception of 1951," he says, "Good weather, favorable to development of the insect pests will bring a heavy infestation. This seems likely since such weather conditions are normal.

"As to buying and shipping, we have found our customers actively purchasing for the last ten days of April, and buying is reported to be good outside the cotton area, too. But the over all picture is one of slow buying in the cotton belt although it is improving. The farmers should be buying much more than they are. Thus, if a heavy infestation should come, they could be in serious trouble because of a pesticide shortage.

"Despite a reported heavy carry-over inventory in the industry, there isn't too much material on hand and not much is being manufactured. This is due largely to the price structure which has affected trade all up and down the line.

"If non-manufacturing continues another 4 or 5 weeks and a sudden infestation comes, it will be a bad time for the small mixer and others who will then be confronted with the paradox of an unprofitable season in the midst of heavy demand."

Giving a slightly different geographical slant on the pesticide situation, an executive of a Florida company states that business has been very good in both vegetables and citrus, but the former is facing a seasonal decline.

"Indications on citrus are that we will have a very good year", he asserts, and continues by observing that the growers are going ahead and spraying their groves for insects that appear on citrus. "The big spray program for citrus will be during the summer", he explains. "Red and purple scale, rust, six-spotted and purple mites are some of the pests which cause considerable damage to both trees and fruit if they are not controlled.

The following report from a concern which operates a nation-wide business reviews the outlook in a number of widely separated areas:

"Fruit crop prospects are good. Cold weather April 17th to April 20th reduced the peach and apple crop somewhat in the Ozark Mountain area and in the southern Mississippi Valley area. Demand for insecticides and fungicides from fruit growers has been good. Buying has been delayed until close to the use season, however, and some difficulty has been encountered in supplying the trade during the last several weeks. Buying during January and February was at a sub-normal level. Rather general rains are favorable for apple scab development and fungicide consumption.

"Cotton planting has been delayed in the Mississippi Delta area due to abnormally heavy rainfall. Cotton boll weevil survival is reported to be quite high. With favorable weather during June and July, a high cotton insect infestation could develop. The very substantial and depressing inventory of cotton insecticides still remains. Prices are disastrously low. Buying is at a low level.

"Forage crop insecticide consumption continues to expand. Areas not interested in forage crop insecticides in the past are buying substantial quantities. This market promises to be one of the more hopeful for increased business in future years.

"Herbicide sales are normal. The new chemicals with specific properties appearing on the market for selective weed control are expanding the market in a satisfactory manner.

SOME participants in our symposium on the insecticide market outlook did not wish to be quoted directly, so we have not identified any of the direct quotes. We do wish, however, to express our thanks and the thanks of the trade to those who have made possible this last-minute summary on the outlook for the new season's business. They included P. J. Reno of Hercules Powder Co., Dallas; John Chase, Port Fertilizer & Chem. Co., Los Fresnos, Texas; E. S. Heckathorn, Heckathorn & Co., San Francisco; G. F. Leonard, Tobacco By-Products & Chemical Corp., Richmond, Va.; Carl Behse, Agricultural Chemicals, Inc., Llano, Tex.; Sam Marshall, Central Chemical Corp., Hagerstown, Md.; Carlos Kampmeier, Rohm & Haas Co., Philadelphia; S. H. Bear, Niagara Chemical Div., Food Mach. & Chem. Corp., Middleport, N. Y.; J. N. Hall, Pioneer Chemical Associates, Denver; C. M. Nabors, Flag Sulphur, Tampa; and W. H. Prigmore, Eastern States Farmers Exchange, W. Springfield, Mass.

"Prices for many insecticides and some fungicides are at extremely low levels. The surplus inventories of several of chlorinated hydrocarbons are having a very depressing affect on the whole insecticide price structure. Crude sulphur and fungicides produced from sulphur advanced in price recently. Copper products prices have fluctuated mildly.

"On the whole 1954 promises to be a moderately good year from a volume standpoint, but unsatisfactory from a profit standpoint."

The following comments reflect conditions reported by a series of twelve district managers in areas from Maryland to upper New York State:

"The bulk of our domestic early-season sales are for the fruit trade. Although sales are slow starting, they have been fairly good. This is due to the fact that apple growers had a good year last year as far as price was concerned and they have a little money to buy insecticides, which is quite a change for them as they have had 3 or 4 years that have been "stinkaroos". Most of them are buying quality merchandise such as the new Captan, Crag, mercurial fungicides, lindane, DDT, and parathion. Wettable sulphurs and lime sulphurs are way off — over 50%. The prices of these are considerably lower, but percentage wise they are not too bad. We think, in general, the apple picture will be normal. The peach trade has been pretty good up until this last week when this district underwent a series of three consecutive frosts and reduced the crop about 25 to 30 percent. This, of course, will make the price a little better, but it of course will curtail the amount of insecticides these peach growers will buy. Personally, I would rather see them buy less and pay for them, than to buy more and get such poor prices for the crop that they can't pay their insecticide and fertilizer bills."

"We are selling a large amount of toxaphene and BHC emulsions for spittle bug control and alfalfa weevil control on clover and alfalfa. This is a new and growing out'et here in the middle Atlantic states and of course, most welcome. So far nothing is being done on vegetable or grain crops, as they are just being planted. Export sales have been off about 80% which I believe is general throughout the trade. The profit on the remaining 20% has just been enough to buy coffee and doughnuts (if you don't drink too much coffee)."

A slow season is reflected in the following comments from another basic producer of insecticides and fungicides:

"It is too early to say whether this will be a bad bug and blight year. However, one thing does seem certain. Formulators, distributors, dealers and farmers seem determined to wait until these problems strike before they begin ordering any quantities of pesticides. True, there are inventories around the country, but a severe epidemic of insects could soon result in an acute shortage, particularly of formulated dusts and sprays to meet the need. Materials are moving, but not in the quantities normally expected at this date."

The following added report from the west coast gives further specific details on conditions there:

"Prices are generally weak, but very spotty, and there are wide fluctuations on the same product in many areas. Early season buying has been light. All insecticides seem available in abundant supply. As for fertilizers, sulphate of ammonia is reported to be temporarily in short supply in southern California.

"The early season bugs seem to be in abundance this year. Thrips, cutworms and aphids are showing up already, with the growing season some three weeks ahead of normal. Usually the early appearance of insects is a reliable indication of a heavy bug year.

"Reduced acreage has not affected the sale of agricultural chemicals noticeably in the west, because most of the reduction has been in marginal land where little or no control was ever used."

INDUSTRY MEETING CALENDAR

Chemical Specialties Manufacturer's Association, midyear meeting, Drake Hotel, Chicago, Ill., May 17-19.

American Plant Food Council, The Homestead, Hot Springs, Va., June 11-14.

National Fertilizer Association, Greenbrier Hotel, White Sulphur Springs, W. Va., June 15-17, 1953.

Pacific Division, American Phytopathological Society, in connection with meeting of American Association for the Advancement of Science, Santa Barbara, California, June 17-19.

Southern Feed & Fertilizer Control Officials, Clemson, S. C., June 22 & 23

Pacific Branch, Entomological Society of America, June 23-25, Connolly's Hotel, Lake Tahoe, Calif.

South Carolina Fertilizer Meeting, Pee Dee Experiment Station, Florence, S. C., July 16, 1953.

Ohio Pesticide Tour, Ohio Agricultural Experiment Station, Wooster, August 12 to 14.

Connecticut Agricultural Experiment Station Annual Field Day, Experimental Farm, Mt. Carmel, Conn., August 19.

American Phytopathological Society (In connection with American Institute of Biological Sciences), University of Wisconsin, Madison, September 6-10.

American Chemical Society, Fall Meeting, Conrad Hilton Hotel, Chicago, Ill., September 6-11.

Twentieth Annual Fall Meeting, National Agricultural Chemicals Association, Essex and Sussex Hotel, Spring Lake, N. J., September 9, 10 & 11.

Association of Official Agricultural Chemists, Shoreham Hotel, Washington, D. C., October 12, 13 & 14.

Association of American Feed Control Officials, Shoreham Hotel, Washington, D. C., October 14 & 15.

Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C., October 16.

Association of Economic Poisons Control Officials, Shoreham Hotel, Washington, D. C., October 17.

Fertilizer Safety Section, National Safety Council, Chicago, Ill., October 21.

Second Annual Meeting of the Entomological Society of Canada jointly with the Entomological Society of Quebec, Quebec City, Oct. 29-31.

Thirtieth Annual Convention, California Fertilizer Association, Carmel-By-The-Sea, Calif., November 9 & 10.

Sixth Annual Pesticide Application Equipment Conference jointly with 15th Annual New York State Insecticide-Fungicide Conference, Bibbins Hall, GLF, Ithaca, N. Y., November 10-12.

Entomological Society of America, Biltmore Hotel, Los Angeles, Calif., December 7-10.

Illinois Custom Spray Operators' Training School, University of Illinois, Urbana, January 21-22, 1954.

PESTICIDE OUTLOOK

(*Continued from Page 31*)

Also from Texas comes the following view of what the '53 season may produce in the way of infestations, insecticide sales and possible profits:

Mississippi, Arkansas and Louisiana

"There is a current infestation of army and cut worms—primarily on grain crops—severe in spots and spreading into cotton in certain sections. Boll weevil infestations could be very severe if May and June weather remains favorable for propagation—emergence counts are heavy.

South Texas

"Assuming there is adequate moistuer and irrigation water, infestations of wevils, boll worms and pink boll worms could be severe. Spotty infestations of aphids, thrips and flea hoppers are currently developing a small volume of consumption.

Central, East and North Texas

"A severe but somewhat localized infestation of army and cut worms, which seems to be spreading, is causing a moderate consumption of insecticides. Infestations of boll worms and weevils portends to be severe if May, June and July rains are adequate.

West Texas and New Mexico

"Too early to predict infestations, but moisture and irrigation water supplies are currently dangerously low in many localities.

"Liquidations of carry-over stocks largely on a cost or less basis are holding prices at a discouragingly low level, with profits often on the red ink side. This fact, plus a weak financial condition of many dealers, distributors, farmers and blenders, is discouraging all but a minimum of advance buying against anticipated demand. It is conceivable that spot shortages will be limited to some extent by financial position of buyers."

Switching from Texas to the northeast, the following views come from an executive of a Massachusetts farm cooperative purchasing association:

"Our operation is a very regional one, limited to the six New England states, plus Pennsylvania, Delaware, and Maryland. It should also be borne in mind that our method of distribution is limited to working through our own organization only and we are not contacting the trade generally. Our observations therefore are on the basis of a comparison of this year versus last year in a portion of the Northeast and a limited method of distribution.

"Our over-all attitude is one of optimism as far as the volume of materials handled is concerned. The price picture is the most discouraging factor in the 1953 outlook and is the worst of any years that we can remember.

"Price competition is nothing new in this field, but this year it is really rugged. This competition is not entirely a matter of supply and demand. The most important factor is the demoralized distribution structure which has arisen in this industry. This, we know, is an entirely different subject and one which has no place in commenting on the questions which you raised. It is impossible, however, to disregard this factor in making any comment on the price picture as it applies in this industry.

"The weather factor is always of major importance in this area. The extreme amount of wet and generally cold weather which we have experienced during the past month has upset the normal pattern of distribution and will have an effect upon later usage. It has been impossible for many fruit growers to get into the orchard with heavy equipment and thus the normal number of sprays has been somewhat reduced. This has been offset by an increased number of dust applications in an effort to control the scab situation which is a major threat this year.

"The insect problem generally throughout this area is routine, rather than showing tremendous variations from one year to another, and it would appear that it will follow an average course this

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year. There are two factors, however, which make the early usage picture in this area brighter than in the past and they are, first, the greatly increased usage of weed control materials and, second, the spittle bug control program in the Middle Atlantic area.

"Our actual distribution of both dry and liquid materials for the first quarter of this year is substantially ahead of the comparative figures for last year due, largely, to the two factors mentioned above.

"It would be our observation that in this area the fruit growers are inclined to purchase ahead to a substantial degree on their basic requirements; whereas it is much more difficult to sell the wisdom of this program to the vegetable and potato men. It is also our observation that all growers are tending to depend more and more upon the stocks of the distributors and dealers in the area due in large part to the amount of money which is involved in carrying a stock of the newer types of materials, and particularly the 'specialty' items."

Skipping out to the west coast, we have the following comments from an executive of a firm supplying insecticides to formulators:

"Recent interviews with insecticide formulators, and with large and small dealers, particularly in the southwest and in the plains area (Mississippi to Rockies) give us the impression that carry-over stocks in the field are not as large as was generally believed, except for a few formulators in the south west who have sizeable inventories of formulated materials. From where I sit, this means that there is not as much material in the field as there should be at this time of the year, and that there are going to be numerous desperate situations when the use period gets under way.

"The number one deterrent to this inadequate stock situation is, of course, the price picture. The price picture is just impossible; the manufacturers are entitled to full credit for this impossible price situation and no one can blame the formulator (and larger distributor) for not taking constructive action under such price conditions."

Replies to AGRICULTURAL CHEMICALS' *questionnaire were still coming in at press time, but could not be included in the main section. Excerpts of the additional ones will be found on the green sheets bound between pages 114 and 115 of this issue.*

WASHINGTON

(*Continued from Page 56*)

Total consumption of nitrogen on U. S. farms during the 51-52 crop year reached 1,424,780 tons. This compares with the Department estimate that only 1,375,000 tons would be available from the industry. Industry leaders are thus again demonstrating their productive ability.

* * * * *

Some observers are saying that the Food and Drug Administration is hoping to avoid "mid-season confusion" by the delay in issuing proposed residue tolerances. It now appears that the order will not have much direct effect on this year's business since companies affected have the right to request clarification of points at issue. This, along with the customary 90 day waiting period after the proposals are issued, would put the effective date beyond the crop year in many parts of the country.

Food and Drug offcals are set to launch the second phase of their grain cleanup program directed against weevil damage July 1, as scheduled. They feel their program against rat infestation is making some progress. Relaxed standards for weevil damage are due primarily to the lack of a simple quick test. Hence the present 2% standard of weevil-damaged kernels will stand. It's expected

that Food and Drug will gradually tighten standards as the program unfolds. The Commodity Credit Corporation is pledged to adhere to the same standards as set for the trade in a new agreement between the USDA and FSA. The grain cleanup is similar in some respects to the milk inspection program and as such may well take ten to twenty years to become fully effective.

* * * * *

Top officials of BEPQ say they find their time spent much more profitably on urgent problems at hand than on the pending USDA reorganization. Complicating the problem is that the crucial part of the reorganization from the new Administration's point of view is centered on PMA payments and related personnel changes. Nonetheless, BEPQ people keep looking over their shoulders.

BEPQ's cut in Japanese beetle research and control work, made in accordance with the general order to reduce expenditures is bringing heavy mail in protest to many Congressmen. Cuts involved are $100,000 for research and $332,000 for control. Rather than passing on the cut before sending it to the Hill, Secretary Benson tossed the measure in Congressional laps.

* * * * *

A 30,000,000-pound (sulfur content) quota has been established for agricultural sulfur in the second quarter and an open-end licensing policy ordered for sulfur formulations as a result of the improved supply situation.

For the two products used mainly as pesticides, the first quarter quota totaled 41,000,000 pounds (sulfur content) for both agricultural sulfur and sulfur formulations containing 20 percent or more sulfur. Establishment of open-end licensing for sulfur formulations eliminates the quantitative limit on exports, but keeps controls on exports to safeguard the national security, according to the Office of International Trade. The International Materials Conference has discontinued its allocation of sulfur, as a result of the generally improved supply situation.

* * * * *

Over 200 persons registered for the annual meeting of the American Mosquito Control Association at Daytona Beach, Florida, April 13-17. The meeting dealt with all phases of control work. Much interest was evident as papers were presented on the use of granular insecticides for aerial application to penetrate dense foliage and control the larvae in breeding waters. An impressive array of spray and fog equipment was demonstrated.

The group passed a resolution opposing the Delaney Bill but took no action on the Miller Bill due to the pressure of other business.

Newly-elected president of the Association is Dr. Fred C. Bishopp, assistant chief of BEPQ, Washington, D. C., who had served as vice-president and chairman of the program committee. Dr. C. R. Twinn is the retiring president. Others elected are R. E. Corer, Norfolk, Virginia, vice-president; L. W. Smith, Metuchen, treasurer; and T. G. Raley, Selma, California, corresponding secretary.

* * * * *

Congressman Miller also introduced his "Food Bill", H.R. 4901, calling for new regulations concerning chemical food additives. The measure

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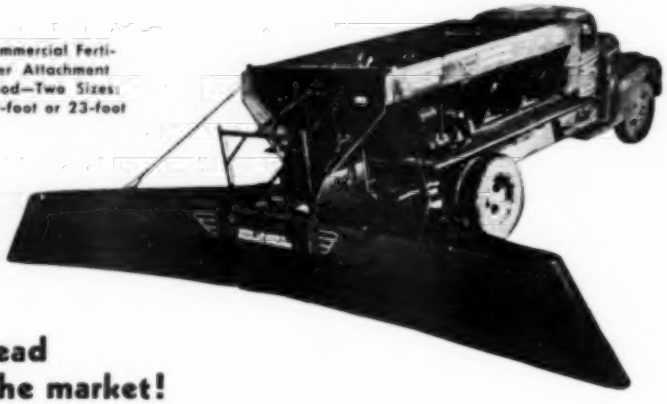

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has been referred to the House Interstate and Foreign Commerce Committee.

It differs from the Delaney Bill by calling for the appointment of a review board by the Food and Drug Administrator, Chairman of the Food Protection Committee of the National Food Committee and the petitioner (company). Miller's Bill also provides for appeal to a District Court and makes it mandatory for the Food and Drug Administrator to set a date for hearings within 90 days after receipt of application.★★

MINOR ELEMENTS

(*Continued from Page 40*)

Means of Application

MINOR elements may thus be applied to the soil, either in the fertilizer, separately, or in the form of nutritional sprays. Nutritional sprays take advantage of the fact that the plant can absorb enough of some elements through the leaves to take care of its economy. Where soil availability problems are acute, such sprays find a wide usage and are highly economical. Originally, this sort of practice was widely regarded as heresy and it was believed that plants could not feed through the leaves.

Much of the early work on minor elements in Florida came in for rather severe criticism from northern technical workers on this ground. The fact that plants can be fed through the leaves is, in many cases now reasonably well established and is common practice.

Such things as copper, zinc, manganese, molybdenum and boron, which are needed in small amounts, can be used in spray form on almost all plants — at least in so far as tests have been run—but difficulty has been experienced in citrus with the application of magnesium in this form, probably because of the very glossy surface of the leaf, which offers an impediment to the absorption of large quantities of an element.

On the other hand, in some areas, magnesium is now applied to apples in spray form with considerable success, and more recently still, nitrogen applications in the form of urea to the leaves of apple trees have been quite successful and are now quite widely used.

The differences between plants are important factors in this regard and where the apple has a relatively soft leaf without a pronounced cuticle, the citrus tree has a very hard leaf with a sort of varnished surface which offers little in the way of retentive power for spray materials and is undoubtedly a considerable barrier to easy absorption. Because a spray works well on one plant, it is dangerous to assume that it will work equally well on another.

For citrus, it has been found desirable to neutralize zinc and manganese before application and thus apply them in a slowly soluble form. Straight applications of solutions of the sulphates such as are used on beans in the Everglades, are generally unsatisfactory on citrus. Concentra-

tions of the salts in dry weather may cause burn, but this is not the important point—rather, that the addition of lime to the sulphate makes a slowly soluble precipitate that has great adhering powers on the slick citrus leaves and can be depended upon to stay on the leaf and in the presence of dew to release minute quantities of the needed element in solution in the dew film. This allows a long period for absorption of the element, compared to the short period which would exist if the sulphate were applied and immediately washed off by rain or by heavy dews.

It is not safe, therefore, to reason that because we need the neutralized sprays on citrus, that beans, apples and other things need the same thing. They have a different type of leaf and different absorptive and retentive powers.

In general, on citrus, we have found the neutralized sprays successful for copper, zinc, manganese and boron, but unsatisfactory for iron, for reasons that will be discussed later. Molybdenum, however, is applied as sodium molybdate in a spray. All of these materials have in their favor the fact that very small amounts of the elements involved are needed and absorption is sufficient to take care of the plant needs. Whether they should be applied as sprays or not, depends upon a variety of other factors.

(*Part II Appears Next Month*)

POTASH SITUATION

(*Continued from Page 50*)

veto the purchase of this potash regardless of any saving in fertilizer costs.

"It seems to us that sending thousands of American dollars behind the iron curtain is helping to defeat the policy of not trading with the Communists. The policy of the G.L.-F. is to refuse to purchase East German potash regardless of cost."

A. N. Fernandez, Representative-at-large from New Mexico, appeared before the committee to ask that American industry's investment of millions of dollars in facilities for production of potash be protected. He reminded that after the first World War the United States let its young and growing potash industry almost die out. He recalled that "at the end of that war, we renewed our trade with Germany, and German imports virtually put an end to the potash industry in the United States.

"Now, after World War II, we find our domestic industry again threatened, this time reportedly by cut-rate imports from the Russian controlled countries. Surely we cannot countenance a situation which could seriously disrupt our own potash industry. It would be dangerous for the Nation as a whole and disastrous for my state of New Mexico."

J. R. Meyers, manager of fertilizer production and purchasing of the Eastern States Farmers Exchange, West Springfield, Mass., a purchasing association of about 90,000 members, indicated that while his organi-

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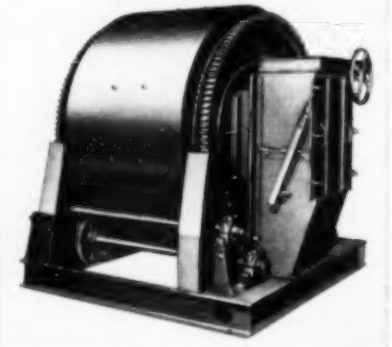

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zation desires to obtain a larger percentage of its requirements from domestic sources, in the past they have been unable to obtain their full requirements from U. S. producers. Thus they are of the opinion that we should continue to import potash to supplement domestic sources. The East is the natural area in which imported potash might be used most economically, he added. Such use would then release domestic production for the sharply increasing demands in other sections of the country; sections to which potash from the southwest can be delivered at lower cost.★★

HERBICIDES

(*Continued from Page 35*)

of compounds. The use of these chemicals for the control of broadleaved weeds in tolerant grasses and other plant species as post-emergence sprays and for the control of annual broadleaved weeds and grasses in tolerant crops as pre-emergence sprays has increased at a rapid rate. Recent studies indicate that 2,5-dichlorophenoxyacetic acid, and 3,4-dichlorophenoxyacetic acid may also possess valuable herbicidal properties. Studies with this group of compounds have been designed to increase selectivity, specificity, and to develop formulations with low vapor activity. Much progress has been made in accomplishing these objectives. For instance, new low vapor activity esters of the phenoxyacetic acid compounds have been developed without sacrificing herbicidal activity. This development has reduced greatly the hazard of using these chemicals near adjacent susceptible crops. Much emphasis has also been given to the development of phenoxy derivatives of somewhat lower activity than 2,4-D in an attempt to control weed species with less crop injury. Our rate of progress here has been nothing less than dramatic.

The substituted phenols. The dinitro alkyl phenols and chloro substituted phenols have been used widely as contact selective and non-selective post-emergence herbicides. More recently they have been developed as pre-emergence herbicides in a number of large seeded crops including cotton, peanuts and soybeans. Essentially contact, non-translocated herbicides, very little information was available on the basic effects of these chemicals on plant growth until recently. As illustrated in Table 1, emphasis has been placed on selectivity, specificity, lower phytotoxicity, and lower vapor activity in the successive development of the ammonium, triethanolamine, and alkanolamine salts of dinitro ortho secondary butyl phenol. More fundamental research is needed to understand more fully the effects of this group of chemicals on plant growth.

The carbamates. The substituted N-phenyl carbamates have exhibited a high degree of selectivity and specificity as herbicides. This high degree of specificity and selectivity has led to their wide scale use as

post-emergence sprays for the control of annual grasses in legume crops, and more recently as pre-emergence treatments for weed control in cotton and other crops. Recent studies indicate that isopropyl N-(3-methylphenyl)carbamate, isopropyl N-(2-methyl - 5 - chlorophenyl)carbamate (Table 2) and other derivatives in addition to isopropyl N-phenylcarbamate (IPC) and isopropyl N-(3-chlorophenyl)carbamate (CIPC) possess important herbicidal properties. As indicated in Table 2, the trend in the development of the carbamates has been to develop derivatives with a high degree of selectivity and specificity.

The substituted ureas. The introduction of the substituted ureas into the field of weed control has greatly stimulated interest in soil sterilization. Two of these compounds, 3-(p-chlorophenyl) - 1,1 - dimethyl-urea (CMU) and phenyldimethylurea (PDU) (Table 2) have shown promise as soil sterilants on non-agricultural lands and as pre-emergence herbicides for weed control in cotton and certain other crops. It is also of considerable significance that these compounds are the first group of organic chemicals having sufficient stability and residual effect in the soil to be used as soil sterilants. Preliminary results indicate that the toxic effects of these chemicals at soil sterilization rates may persist in the soil for a longer period of time than any of the chemicals presently being used for soil sterilization. As a group, these compounds provide a long needed, valuable addition to the field of soil sterilization as a method of controlling weeds on non-agricultural lands.

For the first time, we have chemicals that may be applied successfully at low pressure and low gallonage as pre-planting, pre-emergence, post-emergence and soil sterilization treatments.

In 1945, hardly any investigator would have believed it possible to develop a chemical with greater herbicidal potency than 2,4-D. Yet in less than five years we have but to witness the herbicidal activity of

the substituted ureas. This development indicates that we have accomplished an objective which many thought impossible.

What then is our rate of progress? Our potential in the control of weeds with chemicals? Re-examine Tables 1 and 2. It is obvious that our rate of progress will be determined largely by: (1) the discovery of more selective, better translocated, more efficient, better formulated, and more economical herbicides, (2) a basic, fundamental understanding of the effects of chemicals on plant growth, (3) our ingenuity in supplementing and combining chemical and cultural practices and, (4) the development of new and more efficient weed control techniques.

As the public becomes more aware of present weed losses and the potential we have for reducing these losses through the use of chemicals, great pressure is brought to bear for research to find immediate solutions. This situation is intensified by the fact that herbicides are being developed at a rapid rate and new ones are continually coming in.

One of the most important and critical tasks is to find the time, manpower and money to build up a reservoir of fundamental research out of which may come the practical applications. The time element must be stressed. Fundamental studies cannot be hurried.

The chemical approach to weed control is a new and more complicated one than has been used previously. A large body of fundamental studies in plant physiology, ecology, agronomy, horticulture and chemistry must be carried on continuously if scientists are to come up with long-term answers to the weed problem.

Educational and extension programs are also greatly needed. Nevertheless, the estimated heavy annual loss due to weeds could easily be cut in half if we applied our present knowledge to the production of crops in 1953.

Certainly we have only scratched the surface of a new science and a new field. Weed control could develop into one of the greatest consumers of agricultural chemicals.★★

TECHNICAL BRIEFS

(*Continued from Page 52*)

of bordeaux should not be made before the first week of August.

Two relatively new materials, "Orthocide 50" and "Manzate," when used as single materials at the rate of 6 to 8 and 4 pounds per acre, respectively, have controlled early blight and anthracnose as well as the ziram-bordeaux schedule and sometimes with better yields. They have not been tested under severe late blight conditions in New York.

Over-all coverage is of particular importance, whether the material used is a spray or a dust. While dusts may be as effective as sprays against insects, it is generally conceded that high-gallonage, high-pressure sprayers are most effective against tomato diseases. Dusts do not stick as well as sprays, and care should be exercised in the selection of stickers. Some stickers are of little use and not all types are compatible with every material.

Finally, Mr. Schroeder observes, false efficiency can rob one of good control. Speed and low cost are sometimes considered ahead of the necessity of good coverage and retention in a spray program. Thus, methods which appeared to be quick and cheap may turn out to be most expensive.

Attempts to outguess the imminence and progress of a disease by delaying applications of the fungicide are often disastrous, the author declares. This is particularly true with anthracnose.

Covering the area too fast with an inadequate concentration of material is inefficient. Experiments during the past several years show that the spraying operation can be speeded up without sacrificing control if one maintains a constant dosage of material per acre. For instance, 4 pounds of material per 100 gallons at 100 gallons per acre have given as good coverage and disease control as the same material at a concentration

of 2 pounds per 100 gallons and 200 gallons per acre. This reduces the amount of water to be hauled and increases the number of acres that can be covered in a given time. Heavier concentration and lower gallonages have not proved themselves as yet.

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San Jacinto, S-D in Merger

R. B. Douglass, president of Smith-Douglass Company, Inc., and E. M. Fleischmann, president of San Jacinto Chemical Corporation, have announced that stockholders of both of the companies had approved a merger with Smith-Douglass as the surviving corporation. The merger was to become effective as of April 30th, 1953.

Smith-Douglass, the surviving corporation, will issue to San Jacinto stockholders $1,000,000.00 of 5% Convertible Subordinated Debentures due April 30th, 1957, and 75,000 shares of its common stock for all of the 250,000 shares of San Jacinto now outstanding.

APFC MEETING

(*Continued from Page* 37)

Institute; Sherman Hoar, National Association County Agricultural Agents; Herschel D. Newsom, Master, The National Grange; Roderick Turnbull, editor, *Weekly Kansas City Star*.

An annual feature of the convention will be the agricultural forum on June 13. Speakers will be extension agronomists representing various sections of the United States.

Rep. Walter H. Judd (R-Minn.) will be the banquet speaker on Saturday evening, June 13. He is a native of Nebraska, holds degrees from the U. of Nebr., served in World War I and is regarded as an international authority on the Near East.

H. H. Maynard, chairman of the Department of Business Organization, Ohio State University, will be the final speaker on the Saturday morning program.

Members of the Council's executive and convention committees are: chairman, James F. Doetsch, pres-

ident, Chilean Nitrate Sales Corporation; John V. Collis, president, Federal Chemical Company; George W. Gage, president & general manager, Anderson Fertilizer Company, Inc.; C. B. Robertson, president, Robertson Chemical Corporation; W. T. Wright, vice-president F. S. Royster Guano Company; and George E. Petitt, vice-president, Potash Company of America (ex officio.) ★★

PESTICIDE PLANT

(*Continued from Page 55*)

Wet and Dry Products

ENGINEERED to formulate both wettable powders and liquid pesticides, the Northeastern plant has installed an ultra-modern array of equipment for performing the job efficiently.

Following a typical mix of DDT through the plant, the material, in either paper bags or fiber containers, is loaded onto a tilt elevator which hoists it to a platform about 20 feet above the floor, dumps it into a Sprout-Waldron brush sifter and premixer which performs an intimate blend of the toxicant and its diluent.

The material then descends by gravity through a mirror-like stainless-steel chute (equipped with a Syntron vibrator which prevents sticking of any material in the chute) into a surge bin from which the material enters a Raymond "Imp" mill which reduces it to the desired particle size.

The material is removed from the mill by an air stream. In being taken off, it passes through a "Whizzer" separator where it is classified according to desired fineness. Particle size is determined by the speed of the Raymond "Whizzer" mechanism, and the RPM is governed by setting a dial. Particles too large for use are returned to the mill for regrinding and the acceptable material is air conveyed to the cyclone product collector which separates the product from the air and drops it through a motorized double-flap valve which allows the finished product to drop into a surge bin below. The double valve prevents the return of air to the cyclone equipment above. Air separated from the product in the cyclone is returned to the system.

The final surge bin, of course, feeds the St. Regis bagger from which the filled bags are trucked to the storage room or to waiting vehicles at a near by loading platform for either rail or motor transportation.

A hood covering the bagging device has in connection, a suction device which removes all stray particles of dust and puts them through the "Day Dust Filter" which, through high pressure reverse air jet filtering, collects the particles and returns them to the surge bin just above the bagger. An additional screw conveyor, designed by Mr. McKenna for this purpose, transports the material back to the bagging machine.

Liquid Manufacture

AS mentioned previously, every possible precaution has been made for the protection of personnel handling liquid parathion and other toxicants delivered in drums. In opening a drum of parathion, for example, the workman pulls down over the drum a hood which is supported by cables on counterbalanced pulleys for ease in handling. Heavy rubber flaps comprise the front of the hood, and the workman reaches his gloved hands through the tight opening to remove the plugs. The top of the hood is transparent to afford visibility, and a strong suction hose at the top removes all possible fumes. As an added precaution, the worker wears a Pulmosan mask.

In leaving the steel drums, the material goes through a preset Brodie meter which measures the flow to the tenth of a gallon of accuracy. Thus, with meters set for both the toxicant and the solvent being used, an operator can control the amounts which go into the 600-gallon holding tank in which its makers, A. E. Poulsen Co., has custom-installed a plastic lining to prevent corrosion. The lining is a phenolic base acid-resistant material.

In order to give an accurate double-check on the amount of liquid being pumped into the holding tank, the entire tank arrangement is situated on a platform scale which gives

Pesticides-Residue Amendment

To the Federal Food, Drug, and Cosmetic Act

H. R. 4277 and S.1542

What it means to Pesticide Manufacturers

The legislation provides for:

- **Prompt issuance of residue tolerances for pesticides or exemption from a tolerance.**
- **The referral of the data to a committee of experts at the request of a petitioner for a tolerance or at the request of the Federal Security Administrator*.**
- **Adequate provision for court review of the Federal Security Administrator's action.**
- **Elimination of costly and cumbersome public hearings to establish a tolerance.**
- **Consideration of pesticides in a separate section of the Federal Food, Drug, and Cosmetic Act and defines the term.**
- **The simplification of the procedure to establish that a pesticide is efficacious.**

**Now the Secretary of the Department of Health, Education and Welfare.*

We believe the adoption of this amendment will stimulate research by symplifying procedures for the introduction of efficacious, new products. For detailed information write to the Executive Secretary:

NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

910 SEVENTEENTH STREET, N. W. WASHINGTON 6, D. C.

the operator an additional check in pounds, translated into gallons.

Optimum temperatures are assured for the blending tank by a "Kwik-Steam" generator which is said to generate 1.25 million BTU's in a very few minutes and which Mr. McKenna says can heat in 15 minutes, some 600 gallons of solvent to the correct temperature for solvency of any of the chlorinated hydrocarbon toxicants.

A system of shut-off valves enables the plant to maintain maximum control over the flow of liquids at all times. All pumps for transferring toxicants are hooded as a safety measure.

Solvents, delivered in tank cars, are transferred by a powerful pump which can unload a car in about 40 minutes. A single storage tank of 10,000 gallon capacity is situated outside the plant and additional ones are planned for the future. Valves in connection with unloading solvents enable the operator to direct the material either to the outside storage tank or into holding tanks for immediate use.

Output of the Westbrook plant, located at the edge of Portland, Maine, will be distributed through regular trade channels to growers in all of New England, according to present plans. The plant has been constructed with an eye to all-year-round production. . . . utilizing the equipment for the manufacture of other types of chemical products during the off-season for pesticide manufacture. Ground was broken for the new plant in September, 1952, and the opening was set for May first, 1953. A relatively mild winter made possible a more rapid work schedule than was at first anticipated, Mr. McKenna said.★★

BREVITIES

(*Continued from Page 85*)

Agricultural Appropriations subcommittee that despite a twelve-year program to halt the spread of this pest, its scope has increased continually. He recommended a cut of $332,000 for this work, but asks for $150,000 to continue surveys to establish where new infestations are occurring.

•

MONSANTO CHEMICAL CO., St. Louis, Mo., has prepared wall posters written in Spanish and Portugese for use of formulators who export agricultural chemicals to countries where these languages are used. The posters give detailed instructions on the safe handling of parathion. They are 2 x 3 feet in size and are illustrated with eye-catching drawings of five items of protective equipment to be worn while working with parathion: goggles, mask, apron, gloves and boots.

LISTENING POST

(*Continued from Page 95*)

area, but heavy oviposition between April 1-7 was indicated. This insect was not as plentiful in Ulster County, New York as last year. The first egg masses found in Dutchess County, New York were observed April 9 and a strong flight was observed the same day in Columbia County, New York.

In Delaware, during late March, the apple grain aphid was observed hatching in large numbers in comparison to the first observation being made April 8 last year. In Southern Adams County, Pennsylvania, this insect was hatching March 19 and in the southern Illinois, March 18. In early April, the rosy apple aphid was hatching generally over the southern half of New Jersey. Hatching also occurred in southern Pennsylvania during late March and early April. In New York, rosy aphids were first observed in Saratoga County April 2 and Monroe County April 8. First hatching was observed in Niagara County April 6.

European red mite were abundant in Delaware during early April even where dormant or delayed dormant sprays had been applied. A heavy carry over of European red mite eggs was reported from southern Indiana and northeastern Ohio.

Geist to Young Machinery Co.

WM. J. GEIST

Henry T. Young, president of Young Machinery Co., Muncy, Penna., announces the appointment of William J. Geist as general sales manager. Mr. Geist was formerly associated with Sprout, Waldron & Co. where he specialized in serving the tobacco, chemical and allied industries.

In his new position, Mr. Geist will create a sales organization in keeping with the new expansion program soon to be launched by Young Machinery Co. Mixing and blending equipment as well as materials handling equipment are to be given special attention in this new sales program.

•

Dr. Rinehart to Gypsum Co.

Dr. James C. Rinehart has been appointed development agronomist by United States Gypsum Co., the firm has announced. Dr. Rinehart was formerly with Rutgers University, New Brunswick, N. J. and has had wide experience relating to the effects of gypsum when applied on different types of soils.

As a Research Fellow on gypsum at the N. J. Station, Dr. Rinehart supervised experimental work which is reported to have had beneficial results on the properties of clay soils.

SUPPLIERS' BULLETINS

(*Continued from Page 53*)

from ingredients involving liquid impregnation. Both the dual and standard units handle 40 cubic foot batches.

Write for bulletins CP-310 and LF-110, A. E. Poulsen & Co.,

3305 E. Slauson Ave., Los Angeles 58, Calif.

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Nopco Emulsifier Bulletin Out

A technical bulletin describing "Agrimul" emulsifiers has been prepared by Nopco Chemical Co., Harrison, N. J. Three types of emulsifiers are available for BHC, chlordane, lindane, toxaphene and other agricultural chemicals, the bulletin states. These types are nonionic, anionic and combination which the makers state will provide formulators with a versatile means of solving problems related to water conditions, coverage and adhesion. The bulletin is available upon request.

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New Books Available

Plant Disease Handbook by Cynthia Westcott, Published by D. Van Nostrand Co., New York. 746 pages, 6 x 9 inches, cloth binding.

The bulk of this text comprises an alphabetical listing of specific plant diseases and their remedies when known, and an alphabetical listing of host plants and their diseases, classified under their common names with the diseases of each listed, and notation of the States in which each individual disease has been reported for the host plant. Valuable introductory chapters present a brief review of plant diseases and plant pathology, garden chemicals and their application, and a systematic classification of plant pathogens.

Frequent drawings and photographs illustrate important entries. The author of this text has also written the *Gardener's Bug Book*.

* * *

Principles of Agriculture by W. R. Williams, and G. V. Jacks. Published by Chemical Publishing Co., New York. 156 pages, 6 x 9 inches, cloth binding, price $3.75.

The agricultural system discussed in this book is based on the concept of soil fertility that "there is no such thing as a bad soil . . . only bad agriculture." The text is a translation by G. V. Jacks of the teachings of Russia's soil scientist, W. R. Williams. Principal topics treated in the text are plants and soil requirements; agricultural soils; loss and restoration of soil fertility; the grass-arable system; the arable rotation; the principles of soil cultivation with the plough and foreplough; autumn cultivation of the soil; presowing cultivation of the soil; fodder rotation, chemical conditions of soil fertility; and mineral fertilizers.

* * *

Soil Chemistry by M. Y. Shawarbi. Published by John Wiley & Sons, Inc., New York. 420 pages, 6 x 9 inches, cloth binding price, $5.00.

Soil problems are broken down into the base elements in a thorough analysis of the chemistry of soils, what they are and how they react. This text considers general composition, elements of the soil, soil treatment, soil formation processes, classification, chemical aspects, soil conservation, soil and agriculture, and other phases involved in the study of soils. The book is designed particularly to be of value to growers.

* * *

Soil Microbiology by S. A. Waksman. Published by John Wiley & Sons, Inc., New York. 356 pages, 6 x 9 inches. Cloth binding, price $6.00.

A discussion of the soil microbiological population, the general flora and fauna of the soil, and the mutual interrelationships among microorganisms; the decomposition of plant and animal residues and the general applications of soil microbiology to other fields of knowledge are among the topics covered in this text. As indicated by the author, the text is designed to present a broad outline of the subject, with particular appeal for the beginner and person interested in a comprehensive review and analysis. A selected bibliography provides references for a more thorough research.

Dixie Guano Building Plant

Dixie Guano Company, Inc., is constructing a new fully-automatic addition to its present plant at Laurinburg, N. C. The addition, measuring 150 x 260 feet, will have 39,000 square feet. It is of standardized settlframe construction, and will be fully automatic in operation. Only one man will be required to handle the entire bulk storage area during seasonal lulls.

Plans at present call for completion of construction by June and for occupancy early in the fall. The new structure, built by Luria Engineering Co., Bethlehem, Pa.; will connect to the present plant by a 150-ft. bridge that will span three railroad tracks. Bulk mixed fertilizer from the existing plant will be carried by a system of conveyor belts, it is reported.

•

Rat Repellent Protects Boxes

A new rodent repellent material, "Good-rite z.a.c." has been introduced by B. F. Goodrich Chemical Co. The repellent, applied on cardboard boxes containing food attractive to rats, protected the containers for as long as 45 days.

MITE CONTROL

(*Continued from Page 43*)

States, will have to be changed. Many older names were proposed for the same species in Europe; and it is probable that failing to go back to *telarius*, we shall have to use an almost unheard-of name. It seems that there would be advantages in starting all over with a new name.

Distribution Patterns

ALTHOUGH there may or may not be any practical consequences involved, it would be very interesting to know why the citrus red mite is a pest in California and Florida, but is unknown in Texas; why the Banks spider mite, *Eutetranychus banksi* McGregor, is common on citrus in Florida and Texas, yet is unknown in California; why the two-spotted spider mite is often common in eastern and western North America but rarely encountered in Texas. All three species are known to occur in other parts of the world, but factors affecting their establishment and success geographically are not evident.

Summary

A number of interesting and significant problems relating to mite taxonomy and biology and the indirect effects of organic chemicals have been discussed. The following points are of particular concern.

1. The use of organic insecticides on agricultural crops has not only increased the mite problem in general, but it has often created new problems with mites that were relatively unknown before.

2. It is important that the economic entomologist know the specific identity of the mites with which he is concerned, but he should bear in mind that there are unsolved taxonomic problems.

3. A knowledge of the biology of a spider mite is often of considerable importance to the agricultural entomologist, and many biological studies are needed.★★

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FUNGICIDES

(*Continued from Page 48*)

51". A spray-tank mixture of SDDC plus ferrous sulfate gave slightly better results than ferbam as "Fermate". On potatoes, the tank-mix formulations of "Vancide 51" and "Zac" again gave better control of early blight than did the corresponding wettable powder formulations. There was little to choose between the two formulations of ferbam, with both giving comparatively poor disease control.

In an experiment where there was a severe attack of early blight on staked tomatoes, a tank-mix formulation of zineb was slightly inferior to the wettable powder, and a spray-tank mixture of nabam and $MnSO_4$ gave less control of the disease than did "Manzate". On the other hand, a tank-mix formulation of ziram gave considerably better control of defoliation due to early blight than was obtained with "Zerlate" as a wettable powder.

Early blight of celery became quite severe in an experiment located at the State Muck Experiment Station in 1952. "Manzate" gave excellent control of the disease, with the tank-mix formulation of nabam and $MnSO_4$ being somewhat less effective. Nabam plus $ZnSO_4$ gave somewhat better control of the disease on the foliage than did zineb. "Vancide 51" plus $ZnSO_4$ gave approximately the same degree of control of the disease on the foliage as did a wettable powder formulation of the same material, but the plots that received the tank-mix formulation produced a considerably larger yield.

Conclusions

Ziram in the form of a slurry, in which the active ingredient is not dried following its formulation, is more effectve as a fungicide than the wettable powder.

Also, ziram prepared as a tank-mix formulation by adding an aqueous solution of $ZnSO_4$ to a partially diluted solution of sodium dimethyl dithiocarbamate (SDDC) is a better fungicide than the corresponding wettable powder formulation.

The tank-mix equivalent of "Zac", that is obtained by adding solubilized $ZnSO_4$ to a SDDC-cyclohexylamine complex, will give better control of early blight of potatoes and tomatoes in most instances than "Zac" formulated as a wettable powder.

A tank-mix formulation of an aqueous solution of zinc sulfate added to the "Vancide 51" complex proved to be a more effective fungicide for the control of early blight than were the wettable powder formulations of "Vancide" that were submitted for experimental use.

Zineb prepared as a wettable powder gave as good control of various vegetable diseases over a period of several years as was obtained with the corresponding tank-mix formulation that was prepared by adding solubilized $ZnSO_4$ to nabam.

Finally, there is some evidence that a formulation of nabam and an aqueous solution of $MnSO_4$ is not as effective in the control of various foliar diseases of vegetables as is the wettable powder equivalent known as "Manzate".

A more complete discussion of this series of experiments on the comparative disease-control efficiency of different formulations of various dithiocarbamates is available in Research Circular 9 of the Ohio Agricultural Experiment Station.

Classified ADVERTISING

Rates for classified advertisements are ten cents per word, $2.00 minimum, except those of individuals seeking employment, where the rate is five cents per word, $1.00 minimum. Address all replies to Classified Advertisements with Box Number, care of AGRICULTURAL CHEMICALS, 175 Fifth Ave., New York 10. Closing date: 25th of preceding month.

Situations Wanted:

NINE YEARS EXPERIENCE in research and development of agricultural chemicals of all sorts. Background in chemistry, plant pathology, and weed control. Wish position in charge of research or development. Address Box No. 738, c/o **Agricultural Chemicals.**

SALESMAN: West Coast salesman open for new connection in chemicals, insecticides, drugs, etc. Successful sales record for fifteen years. Wants hook-up preferably with basic manufacturer. Not interested introductory commission deals. For further information, write to Box No. 739, c/o **Agricultural Chemicals.**

HORTICULTURAL PHYSIOLOGIST: Ph.D., available June, 1953, married, experience in soils, fertilizers, herbicides, and growth regulators. Broad biochemical background. Publications. Seeks research position in herbicides or other agricultural products related to horticultural or field crops. Address Box No. 740, c/o **Agricultural Chemicals.**

B.S. IN RANGE MANAGEMENT from Texas A&M College. Five years experience in chemical control of woody plants with USDA research station. Seeking research or technical sales position in southern, southwestern, or western locality. Address Box No. 741, c/o **Agricultural Chemicals.**

ENTOMOLOGIST: B. S., Married, presently associated with mid-west insecticide firm. Desire western location in research and development or straight field work. Two years experience in formulation and field work. Will also consider technical sales. Address Box No. 742, c/o **Agricultural Chemicals.**

AGRICULTURAL CHEMIST: 31, Ph.D. European University, Italian, married, five years experience as researcher in both fungicide and insecticide development work. Formerly Assistant Professor, United States College. Speaks, writes fluently English and French. Background in chlorine-organic derivatives. American business, personal references. Address Box No. 743, c/o **Agricultural Chemicals.**

RESEARCH ENTOMOLOGIST: 36, Eleven years experience in research development and sales with leading firm. Experience includes labeling and registration, preparing sales literature, fundamental laboratory and field research and direct sales. Willing to locate anywhere in U. S. Acquainted with problems peculiar to various sections of country. Best of references. Available immediately. Address Box No. 744, c/o **Agricultural Chemicals.**

ENTOMOLOGIST: Ph.D., minor plant pathology. Experiment station and commercial experience includes both laboratory and field evaluation of insecticides, fungicides and herbicides, formulation, sample preparation, quality control, etc. Excellent chemical and biological education. Desires responsible position in research, development or administration. Address Box 745, c/o **Agricultural Chemicals.**

AGRICULTURAL CHEMICALS SPECIALIST: Experience in sales of fertilizer and agricultural chemicals, also in farm management. Seeks position as sales representative. Address Box No. 746, c/o **Agricultural Chemicals.**

I'M LOOKING FOR TROUBLE! Sales trouble or management trouble. Available this fall, young executive with combination of ability, drive and broad knowledge of fertilizer industry problems. Not seeking soft job; interested in a challenge. Compensation to be based on actual accomplishment rather than promises. Address Box No. 748, c/o **Agricultural Chemicals.**

Positions Available:

WANTED CHEMIST: Position open for analytical chemist in fertilizer control laboratory. Prominent mid-western company. Send qualifications to Box No. 734, c/o **Agricultural Chemicals.**

PRODUCTION MANAGER: Manufacturer and mixer of insecticides, fungicides, other agricultural chemicals open for production manager for plant located in Deep South. Man about 35-40 with a few years of plant experience and good record wanted. Chemical training useful, but not essential. Send full information in confidence to Box No. 735, c/o **Agricultural Chemicals.**

CHEMIST: Insecticide manufacturer with national distribution requires services of chemist who may also be equipped to oversee factory operations. Must know insecticides and raw materials. Young man with few years experience. Eastern location. Address Box No. 736, c/o **Agricultural Chemicals.**

SALESMAN: Wanted by leading manufacturer of insecticide, chemical and drug basic materials, young man with a few years sales experience. Knowledge of these materials not necessary. We will train man. Excellent opportunity for young man to break in as part of sales staff of aggressive and well known firm. Give full record, starting salary wanted. Address Box No. 737, c/o **Agricultural Chemicals.**

For Sale:

FOR SALE: Corporation organized October 23, 1931 actively engaged in business, in agricultural chemicals and popular priced household insecticide spray since 1944. Situated in best central southern distributing point for servicing all major crops, potatoes, soybeans, corn, cotton, truck and garden crops. Plant located on railroad siding. All necessary equipment and machinery on hand and in good workable condition. Long lease or purchase of plant possible. Full exchange references. Address Box No. 747, c/o **Agricultural Chemicals.**

STEEL TANKS FOR SALE: Dished heads, all welded. Excellent for storing liquid fertilizer, chemicals, etc. At Marion, Ind. (12) 12,700 gal., (4) 11,000 gal., (6) 5,500 gal. At Norfolk, Va. (13) 15,200 gal., (3) 5,800 gal. At Tonawanda, N. Y. (5) 7,000 gal. At Mt. Carmel, Pa. (9) 4,600 gal., (5) 4,300 gal., (2) 3,800 gal. Perry Equipment Corp., 1428 N. 6th St., Philadelphia 22, Pa.

Mine Safety Co. Elects Ryan

J.T. Ryan, Jr., has been named president of Mine Safety Appliances Company, Pittsburgh, Pa. He succeeds George H. Deike, Sr., who has been made chairman of the board of directors.

The company manufactures some 3,600 products including safety equipment of the type used in insecticide and fertilizer manufacturing plants. Two manufacturing plants are located in Pittsburgh and three in countries outside the U. S.

Mr. Ryan, a graduate of Pennsylvania State College and Harvard, is the son of J. T. Ryan, Sr., who, with Mr. Deike, founded the company in 1914.

Index to ADVERTISERS

The industry meeting calendar, formerly found on this page, appears on page 115 this month.

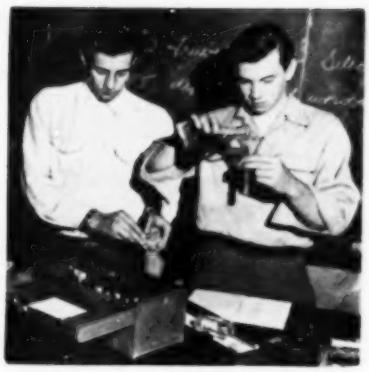
(The Advertisers' Index has been checked carefully but no responsibility can be assumed for any omission)

Tale Ends

CHEMISTRY classes in at least one high school are being practical from an agricultural viewpoint. . . . Photo shows two students at John Marshall High School in Cleveland, Ohio, learning about chemicals and chemical reaction by testing the soils of residents in the neighborhood of the school.

Students have been doing this regularly as a class problem and making recommendations of fertilizers to be used . . . result, students have a better understanding of chemistry . . . residents following recommendations of students, have better lawns.

Soil testing equipment used is that of The Edwards Laboratory of Norwalk, Ohio — manufacturers of simplified forms of soil testing.



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Naco Fertilizer Company's Ft. Pierce, Fla. plant is extending its safety activities beyond its own plant. All of its highway trucks have been equipped with light-reflecting tape as an added protection in night driving.

In the photo, left to right: Richard Minton, Ft. Pierce Jr. Chamber of Commerce; James T. Gay, manager of the C of C; Miss ReRon Ingram, Naco Secretary and Jesse Owens, driver of the Naco truck being "taped."

•

Baseball players aren't exactly agriculturists, although they sometimes dig up lots of dirt, but still they are being benefitted by a special formulation of "Krilium" soil conditioner made for treatment of baseball diamonds and similar recreational areas. Following tests made at Ebbets Field, Brooklyn; Busch Stadium, St. Louis; and Wrigley Field, Chicago, improved surface drainage is reported, as well as better footing and sliding conditions. Soil conditioner was applied at the rate of about a pound per 100 square feet.

•

Termite's nightmare song: "I Dreamt I Dwelt in Marble Halls."

The newest, best multiwall bags for valve-packing your fertilizer . . .

Bemis B-FLEX Valve Bags!

You should switch to Bemis B-FLEX promptly because . . .

1. LOWER BAG COSTS. You'll save up to $4 per thousand compared with conventional inner-sleeve valve bags.

2. LOWER PRODUCTION COSTS. Faster handling on your packing machines.

3. FASTER PACKING. Are jam-ups a problem? Not with Bemis B-FLEX. No flapping inner-sleeve to slow down material flow.

4. UNIFORM WEIGHTS. You can hit your weights "right on the button." Stop over-packing.

5. CLEAN PACKAGE. Minimum sifting.

6. BETTER CUSTOMER SATISFACTION. No loose, torn sleeves to get into the farmer's drill.

And, of course, you get the added benefit of Bemis' crisp, bright, multi-color printing — the finest printing your brand can have on multiwall bags.

Ask your Bemis Man for the complete B-FLEX story.

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Principal Cities

The Unseen Ingredient--

RECORD OF PERFORMANCE

You can get it in

Pyrenone* INSECTICIDES

Choosing the best insecticide for any given control problem is not easy. Sometimes the facts are confusing and the answer is hard to determine. Particularly in the face of conflicting information and disquieting reports about the effectiveness of some insecticides.

But this much is clear: For assured results, with no build-up of resistance, Pyrenone has the Record of Performance.

U.S.I. has pioneered in the development of low toxic insecticides to meet the specialized needs of sanitarians and pest control operators for effective chemicals without hazards to food products, to people handling or consuming food or to operators applying the insecticides. And through the years, more and more attention has been focused on Pyrenone for these uses.

That's why you will find that for quick knockdown and kill, for effectiveness on a wide range of insects, and for economical results – all without toxic hazards to feed or food, people or animals – you can count on the Record of Performance behind Pyrenone. There are formulations of Pyrenone by leading insecticide manufacturers for almost every pest control application method – aerosol, oil-base sprays, wettable powder, space spray, dusts. When you buy, look on the label for Pyrenone.

Pyrenone*

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U.S.I. INDUSTRIAL CHEMICALS CO.

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